

## A new extinct genus of the tribe Hedobiini (Coleoptera: Ptinidae) from Baltic amber

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A new extinct monotypic genus of Ptinidae, *Carstenium kensbargense* gen. et sp. nov., is described and illustrated based on an inclusion in Baltic amber. The new taxon from a northern European Paleogene forest is compared with extant and extinct genera of the subfamily Eucradinae.

Key words: Eucradinae, Eocene, amber inclusion, paleoentomology, paleodiversity, new taxa

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### INTRODUCTION

The Baltic amber assemblage of Ptinidae is the most diverse known fossil series for the family and includes 56 described species belonging to 28 genera within 8 subfamilies (Alekseev et al. 2023, 2024 and references therein).

The extant subfamily Eucradinae is rarely represented as fossils. Two species have been described from fossil resins: *Crichtonia macleani* Abdullah et Abdullah, 1967 from Eocene Baltic amber (Abdullah & Abdullah 1967) and *Granulobium whitei* Li, Philips et Cai, 2023 from mid-Cretaceous Burmese amber (Li et al. 2023). *Crichtonia macleani* was later placed by White (1969) in the extant genus *Eucrada* LeConte, 1861, whereas Mesozoic *Granulobium* represents the only known extinct genus of this basal-most lineage of the anobiid group (Li et al.

2023). According to the actual systematics of the family (e.g. Zahradník & Háva, 2014; Viñolas, 2020), *Eucrada* (together with the single fossil from Baltic amber) is the single genus within the tribe Eucradini, while other five extant genera of the subfamily (*Anhedobia* Nakane, 1963, *Clada* Pascoe, 1887, *Hedobia* Dejean, 1821, *Neohedobia* Fisher, 1919 and *Ptinomorphus* Mulsant et Rey, 1868) are assigned to the tribe Hedobiini.

In the current paper, a new Eocene genus and species placed in the tribe Hedobiini, *Carstenium kensbargense* gen. et sp. nov. is described and illustrated. The studied inclusion in Baltic amber establishes that the tribe Hedobiini dates back to at least the Eocene and represents the second extinct genus of the subfamily described.

## MATERIAL AND METHODS

The material examined (the holotype) is deposited in the collection of Carsten Gröhn (Glinde, Germany) [CCGG], separately deposited in the Center of Natural History (Centrum für Naturkunde-CeNak; formerly Geologisch-Paläontologisches Institut und Museum der Universität Hamburg), Hamburg, Germany [GPIH]. The amber piece was polished manually with emery papers of different grit sizes, allowing improved views of the included specimen. The amber piece was not subjected to any supplementary fixation.

The observations of specimen were made using a Nikon SMZ 745T stereomicroscope. The photographs were taken using a Canon 90D camera with a macro lens (Canon MPE-65 mm). Extended depth of field at high magnifications was achieved by stacking multiple images from a range of focal planes using Helicon Focus v. 6.0.18 software, and the final images were edited to create figures using Adobe Photoshop 7.0. Measurements of the holotype were made using an ocular micrometre in a stereomicroscope.

The material was studied using traditional comparative morphological methods. The following references were used for the generic attribution and comparison with extant and extinct taxa: Fisher (1919); Abdullah & Abdullah (1967); Español (1968); White (1969, 1971); Logvinovskij (1985); Toskina (2001); Zahradník (2015, 2018); Zahradník & Trýzna (2018); Kono & Yoshitomi (2021); and Li *et al.* (2023).

## SYSTEMATIC PALEONTOLOGY

### Family Ptinidae Latreille, 1802

### Subfamily Eucradinae LeConte, 1861

### Tribe Hedobiini Mulsant & Rey, 1868

**Taxonomic assignment.** The specimen considered here is assigned to the tribe

Hedobiini within the subfamily Eucradinae based on a combination of the following morphological characters: (1) elongate-cylindrical body shape; (2) equal in length abdominal ventrites 2–4; (3) non-clavate femora; (4) antennal insertions well separated; (5) metacoxae not grooved for reception of femora; (6) frons without narrow ridge over bases of antennae; (7) pronotum laterally rounded, pronotal lateral edge absent; and (8) antennae 11-segmented, filiform, with three terminal antennomeres not elongated and not forming antennal club.

### Genus *Carstenium* gen. nov.

Type species: *Carstenium kensbargense* sp. nov., by present designation.

**Differential diagnosis.** *Carstenium* gen. nov. is characterized by the following combination of characters: (1) procoxae completely separated by prosternal process (in contrast to all extant genera of Eucradinae with contiguous or almost contiguous procoxae in *Anhedobia*, *Clada*, *Eucrada*, *Hedobia*, *Neohedobia* and *Ptinomorphus*); (2) median longitudinal ridge in basal half of pronotum absent (in contrast to the representatives of *Anhedobia*, *Eucrada*, and *Ptinomorphus*); (3) lateral pronotal carina absent (in contrast to *Anhedobia*); (4) longitudinal costae on elytra absent and interspaces between arranged in rows punctures weakly convex only (in contrast to most species of *Clada*); (5) antennae filiform with antennomeres not compressed (in contrast to the strongly serrate or pectinate antennae in *Clada* and *Eucrada*); (6) antennae comparatively short, extending about to anterior one-fifth of elytra length (in contrast to majority of Eucradinae with antennae longer, extending to at least one-third of elytral length); (7) antennomeres 3–4 not equal in size and shape (in contrast to subequal, nearly spherical antennomeres 3–4 in *Neohedobia*); (8) elytral punctation arranged in subregular

striae (in contrast to completely irregular elytral punctation in *Ptinomorphus*); and (9) pronotal disc weakly convex, without dorsal protuberance or elevation (in contrast e.g. to some species of *Clada* and *Hedobia*).

*Carstenium* gen. nov. shows external similarity to extant West Palaearctic representatives of *Hedobia* (*H. olexai* Zahradník, 2015; *H. pubescens* (Olivier, 1790); and *H. unicolor* Pic, 1897), but the new fossil genus differs in presence of prosternal process separating the prothoracic coxae, antennae filiform, maxillary palpomere 4 nearly securiform, tarsomere 5 long, dorsal pubescence sparse, and pronotum weakly convex in mediobasal part.

Within the known extinct Eucradinae, *Carstenium* gen. nov. is similar to *Eucrada macleani* (Abdullah et Abdullah), with which it shares e.g. the longitudinally arranged elytral punctation and tribal characters 1–7 mentioned above in taxonomic assignment. However, the new genus can be distinguished by the shorter, non-serrate antennae and by the pronotum shape, which is “hood-like” in *E. macleani* according to the original description (Abdullah & Abdullah 1967). The interpretation of *E. macleani* and *Carstenium* gen. nov. (both found as inclusion in Baltic amber) as conspecific specimens belonging to the sexually dimorphic taxon is recognized as impossible. Original description of *Eucrada macleani* (Abdullah & Abdullah, 1967) states *verbatim* as follows: (1) eyes finely hairy (not as in *Carstenium* gen. nov.), (2) central portion of pronotal disc slightly elevated like a large tubercle (not as in *Carstenium* gen. nov.), (3) maxillary palp filiform, apical segment pointed at apex (not as in *Carstenium* gen. nov.), and (4) elytra coarsely, densely punctate (not as in the specimen under study).

Additionally, *Carstenium* gen. nov. can be distinguished from the Mesozoic genus *Granulobium* Li, Philips et Cai in having punctate head and pronotum (both densely granulate in *Granulobium*), elytral punctation partially arranged in subregular striae (elytral punctation completely irregular in *Granulobium*), equally long abdominal ventrites 2–4 (ventrite 4 relatively short in *Granulobium*), larger body size (body length 5.1 mm in the new genus and about 2.0 mm long in *Granulobium*) etc. However, *Carstenium* gen. nov. shares with Mesozoic *Granulobium* the prothorax unmodified ventrally, and the procaxa separated by prosternal process.

**Derivatio nominis.** The new genus is named after Mr. Carsten Gröhn (Glinde, Germany), recognizing his support of this study. The gender is neutral.

**Remarks.** The new genus is monotypic. Therefore, the generic diagnosis is currently identical to that of the type species.

***Carstenium kensbargense* sp. nov.**

(Figs 1–2)

**Type material.** Holotype: No. GPIH no. 5231, CCGG no. 8711 (ex coll. Jonas Damzen JDC-13523); “Holotype / *Carstenium kensbargense* gen. et sp. nov. / Alekseev V. et Bukejs A. des. 2024” [red printed label]; adult, sex unknown. A rather complete beetle (right elytron damaged and legs partially cutted off during amber piece preparation) with partially exposed metathoracic wings is included in a transparent, yellow amber piece with dimensions of 26×13 mm and a maximum thickness of 3 mm, preserved without supplementary fixation. Syninclusion: one specimen of Nematocera (Diptera).

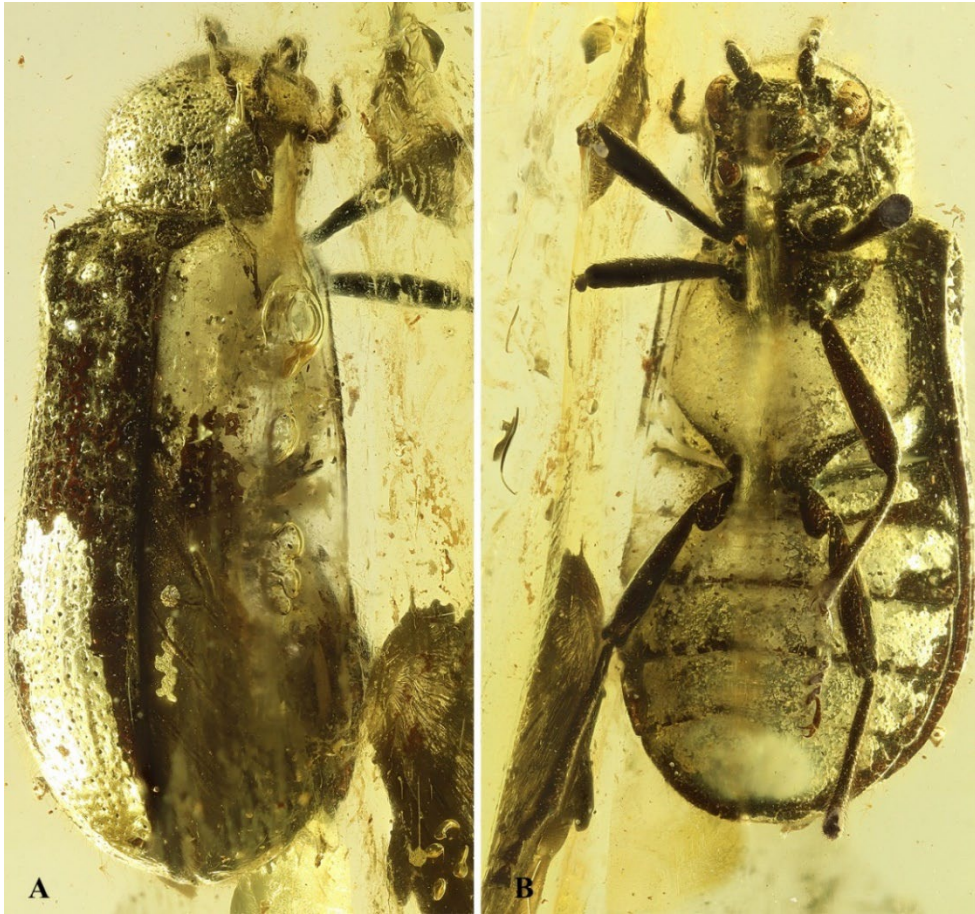


Fig. 1. *Carstenium kensbargense* gen. et sp. nov., holotype, No GPIH no. 5231: A – habitus, dorsal view; B – habitus, ventral view.

**Type stratum.** Baltic amber from Eocene amber-bearing Blaue Erde deposits; estimated age: middle–late Eocene (Standke 1998; Sadowski *et al.* 2017, 2020; Seyfullah *et al.* 2018; Bukejs *et al.* 2019).

**Type locality.** Yantarny settlement (formerly Palmnicken), Sambian (Samland) Peninsula, Kaliningrad Region, Russia.

**Description.** Measurements: body length (from anterior margin of head to elytral apex along midline) 5.1 mm, body maximum width across both elytra 2.15 mm; pronotum

length 1.2 mm, pronotum maximum width 1.5 mm, pronotum width at base 1.4 mm; elytra length 3.8 mm, elytra maximum width about 2.15 mm.

Body shape elongate oval, subcylindrical, subflattened dorsally and slightly convex ventrally; body color dark brown, with pronotum, prothorax and head black (as preserved). Pubescence: dorsum sparsely covered with fine, erect setae; ventral surface of thorax and abdominal ventrites with shorter, semierect setae; legs with denser, fine pubescence.

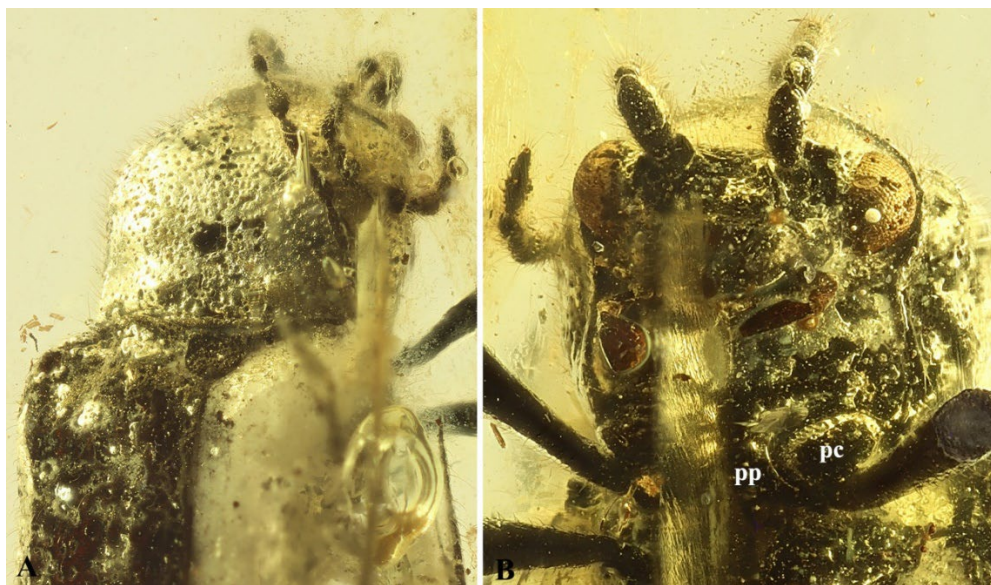


Fig. 2. *Carstenium kensbargense* gen. et sp. nov., holotype, No GPIH no. 5231: A – details of forebody, dorsal view; B – head and prothorax, ventral view. Abbreviations: pc – procoxa; pp – prosternal process.

Head partially retracted into prothorax, densely covered with fine punctation; vertex flat; frons weakly convex. Compound eyes rather small, widely oval, strongly convex, entire, finely faceted, without ommatidial setae; distance between compound eyes wide, equal to  $2.15\times$  vertical diameter of one eye. Mandibles short, robust. Maxillary palpi with four palpomeres; palpomeres 2 and 3 elongate, assymetrical, dilated apically; palpomere 4 nearly securiform, strongly dilated. Antennal insertions distant from inner margin of eyes; narrowly separated by distance of  $0.75\times$  vertical diameter of one eye. Antennae with 11 antennomeres, filiform (antennomeres not flattened), rather short, extending about to anterior one-fifth of elytra length. Scape subcylindrical, elongate,  $2.15\times$  as long as wide; pedicel conical, slightly elongate,  $1.25\times$  as long as wide, narrower and shorter, about  $0.4\times$  as long as scape; antennomere 3 shortest, subtrapezoidal, as long as wide, slightly shorter than pedicel; antennomere 4 conical,

slightly dilated apically, strongly elongate,  $2.0\times$  as long as wide; antennomeres 5–10 subequal in size and shape, subconical, dilated apically, elongate,  $2.2\times$  as long as wide; antennomere 11 spindle-shaped, pointed apically, elongate,  $2.5\times$  as long as wide. Relative length ratios of antennomeres 1–11 equal to 13:5:4:10:10:10:10:10:10:10:10

Pronotum subquadrate, distinctly narrower than elytral base, weakly transverse,  $1.25\times$  as wide as long, with maximum width at middle, lateral sides slightly narrowed anteriorad and posteriorad; disc almost flat, convex anterolaterally and slightly impressed at anterior margin, without carinae. Pronotum laterally rounded, pronotal lateral edge absent. Pronotal punctation small and rather dense, distance between punctures about equal to  $1.0\text{--}1.5\times$  diameter of one puncture; interspaces with dense micropunctation. Posterior pronotal angles distinct, rectangular, sharp; anterior

angles rounded. Anterior pronotal margin rounded and convex medially; posterior margin weakly bisinuate, bordered; lateral sides weakly rounded. Prosternum convex, covered with fine punctation. Prosternal process wide, about 0.8× as wide as transverse diameter of procoxa, dilated apically, with straight apical margin.

Scutellar shield subpentagonal, with slightly rounded apex, transverse, 1.3× as wide as long, densely covered with small punctation.

Elytra subparallel with maximum width in posterior one-third, elongate, about 1.8× as long as wide, weakly convex to flat; basal margin bisinuate; humeri well-developed. Elytral punctation dense, rather large (larger than pronotal punctures), partially arranged in subregular striae, striae more or less distinct on disc, distance between punctures about equal to 1.0–1.5× diameter of one puncture; interspaces apparently weakly convex, covered with micropunctation. Epipleura wide near humeri and gradually narrowing postriad reaching elytral apex, punctate. Metaventrite with disc convex, covered with rather dense, fine punctation. Metanepisternum rather narrow, about 5.1× as long as wide, covered with fine punctation. Metathoracic wings developed.

Legs slender, long. Procoxae subconical, projecting, widely separated by 0.8× transverse diameter of procoxa; mesocoxae nearly globose, narrowly separated by about 0.3× transverse diameter of mesocoxa; metacoxae strongly transverse, 4.0× as wide as long, narrowly separated by 0.7× length of metacoxa. Mesotrochanters subtriangular, rather small; metatrochanters enlarged, drop-shaped, rounded apically. Femora slender, narrowly oval, non-clavate, 5.0× as long as wide, weakly and gradually dilated apically; femora and tibiae subequal in length. Tibiae straight, not dilated apically; with at least one large, curved, sharp apical spur in mesotibia; with two short, right,

sharp and equal in size spurs in metatibia. Tarsi (meso- and metatarsus partially preserved only) long, mesotarsus about 0.8× as long as mesotibia length; tarsomere 1 cylindrical, elongate, 3.1× as long as wide, about as long as tarsomeres 2 and 3 combined; tarsomere 2 subconical, elongate, 1.3× as long as wide; tarsomere 3 triangular, strongly dilated apically, as long as wide; tarsomere 4 widened apically, deeply bilobed; tarsomere 5 long, suncylindrical, slightly curved, about 1.3× as long as tarsomere 4. Tarsal claws simple, about 0.5× as long as tarsomere 5; swollen basally, without tooth.

Abdomen with five visible ventrites, covered with fine punctation; ventrite 1 with small, triangular intercoxal process; ventrite 5 rounded apically. Relative length ratios of ventrites 1–5 equal to 7:11:11:11:16 (measured medially).

**Derivatio nominis.** The species name “kensbargense” is toponymic and derived from “Kensbarg”, i.e. Königsberg (the historical capital of East Prussia) in the Low Prussian dialect of Low German language.

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## REFERENCES

- Abdullah M., Abdullah A. 1967. *Crictonia macleani*, a new genus and species of the Hedobiini (Coleoptera,

- Anobiidae) from the Baltic amber. *Entomological News*, 28: 23–27.
- Alekseev V., Bukejs A., Háva J., Zahradník P. 2023. A new genus and species of Ernobiinae (Coleoptera: Ptinidae) from Eocene Baltic amber of the Sambian Peninsula. *Baltic Journal of Coleopterology*, 23 (1): 51–59.
- Alekseev V., Háva J., Pankowski M.V., Bukejs A. 2024. First record of *Nicobium* LeConte (Coleoptera: Ptinidae: Anobiinae) from Baltic amber with the description of a new extinct species. *Zootaxa*, 5496 (1): 133–139
- Bukejs A., Alekseev V.I., Pollock D.A. 2019. Waidelotinae, a new subfamily of pyrochroidae (Coleoptera: Tenebrionoidea) from Baltic amber of the Sambian peninsula and the interpretation of Sambian amber stratigraphy, age and location. *Zootaxa*, 4664 (2): 261–273.
- Español F. 1968. Notas sobre anóbidos (Coleópteros). XXXIII. Nuevos datos sobre anóbidos de las Islas Canarias. *Miscelánea Zoológica*, 2: 39–46.
- Fisher W.S. 1919. Description of new North American Ptinidae, with notes on an introduced Japanese species. *Proceedings of the Entomological Society of Washington*, 21: 181–186.
- Kono H., Yoshitomi H. 2021. Revision of the genus *Clada* (Coleoptera: Ptinidae) of Japan. *Japanese Journal of Systematic Entomology*, 27: 338–344.
- Li Y.-D., Philips T.K., Huang D.-Y., Cai C.-Y. 2023. Earliest fossil record of Eucradinae in mid-Cretaceous amber from northern Myanmar (Coleoptera: Ptinidae). *Bulletin of Geosciences*, 98 (2): 171–180.
- Logvinovskij V.D. 1985. Family Anobiidae. In: Skarlato, O.A (Ed.), Fauna SSSR. Coleoptera, XIV (2). Nauka, Leningrad, pp. 1–175. [in Russian]
- Sadowski E.-M., Schmidt A.R., Denk T. 2020. Staminate inflorescences with in situ pollen from Eocene Baltic amber reveal high diversity in Fagaceae (oak family). *Willdenowia*, 50: 405–517.
- Sadowski E.-M., Seyfullah L.J., Schmidt A.R., Kunzmann L. 2017. Conifers of the ‘Baltic amber forest’ and their palaeoecological significance. *Stapfia*, 106: 1–73.
- Seyfullah L.J., Beimforde C., Dal Corso J., Perrichot V., Rikkinen J., Schmidt A.R. 2018. Production and preservation of resins - past and present. *Biological Reviews*, 93: 1684–1714.
- Standke G. 1998. Die Tertiärprofile der Samländischen Bernsteinküste bei Rauschen. *Schriftenreihe für Geowissenschaften*, 7: 93–133.
- Toskina I.N. 2001. Three new Palaearctic species of the genus *Ptinomorphus* Mulsant & Rey, 1868 (Coleoptera: Anobiidae). *Russian Entomological Journal*, 10 (2): 143–151.
- Viñolas A. 2020. Catálogo comentado de los Ptinidae (Coleoptera) de la Península Ibérica, Islas Baleares e Islas Canarias. Monografías de la Institució Catalana d’Història Natural. 1, pp. 1–179.

- White R.E. 1969. On *Crichtonia*, described as a new fossil genus of Anobiidae (Coleoptera). *Proceedings of the Entomological Society of Washington*, 71: 597.
- White R.E. 1971. Key to North American genera of Anobiidae, with phylogenetic and synonymic notes (Coleoptera). *Annals of the Entomological Society of America*, 64: 179–191.
- Zahradník P., Háva J. 2014. Catalogue of the world genera and subgenera of the superfamilies Derodontoidea and Bostrichoidea (Coleoptera: Derodontiformia, Bostrichiformia). *Zootaxa*, 3754 (4): 301–352.
- Zahradník P. 2015. Ptinidae, Bostrichidae and Endecatomiidae (Coleoptera: Bostrichoidea) from Aldo Olexa's collection. *Folia Heyrovskyana. Series A*, 23 (1): 115–139.
- Zahradník P. 2018. *Ptinomorphus kratkyi* sp. nov. – a new species from Europe (Coleoptera: Bostrichoidea: Ptinidae). *Studies and Reports, Taxonomical Series*, 14: 497–502.
- Zahradník P., Trýzna M. 2018. Nine new species of *Clada* from Madagascar (Coleoptera, Ptinidae). *ZooKeys*, 806: 121–140.

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