https://doi.org/10.59893/bjc.25(1).005
Baltic J. Coleopterol. 25(1) 2025
ISSN 1407 – 8619

A new species of *Paha* Dajoz (Coleoptera: Zopheridae: Colydiinae) from late Eocene Rovno amber

Andris Bukejs, Vitalii Alekseev

Bukejs A., Alekseev V.I. 2025. A new species of *Paha* Dajoz (Coleoptera: Zopheridae: Colydiinae) from late Eocene Rovno amber. *Baltic J. Coleopterol., 25(1): 61 – 67.*

Based on a well-preserved specimen in Eocene Rovno amber, a new species *Paha groehni* sp. nov. (Coleoptera: Zopheridae) is described and illustrated. The new species differs from extinct species from Baltic amber, *Paha vanivanitatum* Alekseev & Bukejs, 2024, in distinctly smaller body size, as well in characters of pronotal shape and sculpture, first at all in posteriorly curved pronotal carinae and prominent anterior pronotal angles. The studied inclusion represents the first species of a colydiine beetle described from Rovno amber and extends palaeohistorical distribution limits of the genus further eastwards.

Keywords: Synchitini, palaeodiversity, Cenozoic, Paleogene, fossil resin

Andris Bukejs. Institute of Life Sciences and Technologies, Daugavpils University, Parādes 1A – 101, Daugavpils LV-5401, Latvia; e-mail: carabidae@inbox.lv; ORCID: 0000-0001-7165-3023

Vitalii Alekseev. Immanuel Kant Baltic Federal University, Nevskogo 14, Kaliningrad 236016, Russia; e-mail: alekseew0802@yahoo.com; ORCID: 0000-0003-4390-5443

INTRODUCTION

The list of described fossil Zopheridae known from Baltic amber actually consists of 19 extinct species belonging to 16 genera within 6 tribes and 2 subfamilies (Alekseev et al. 2024). Contrary, the published data on zopherid assemblage of Rovno amber is limited by simple statement of the family presence (Perkovsky et al. 2003). Such a comparatively low record number of Zopheridae in Rovno amber is not due to a faunal scarcity or some taphonomic reasons, but, most likely, to insufficient scientific attention paid to beetle inclusions of this fossil resin.

The extant genus *Paha* Dajoz, 1984 includes four described extant species native to the New World (Dajoz 1984; Ivie et al. 2016): *P. guadalupensis* Dajoz, 1984, *P. laticollis* (LeConte, 1863), *P. mexicana* (Hinton, 1935), and *P. mimetes* (Sharp, 1894). One extinct Eocene species of this genus, *Paha vanivanitatum* Alekseev & Bukejs, 2024, being the single member of the genus currently known in the Eastern Hemisphere, has been recently described from Baltic amber (Alekseev et al. 2024).

In the current paper, we present a new finding of a fossil colydiine representative from Rovno amber and describe the second extinct species of the genus *Paha* from the middle–late Eocene European succinite. As

demonstrated by the fossil evidence of inclusion described herein, the present-day New World genus *Paha* was widely distributed in the Western Palaearctic in the Paleogene.

MATERIAL AND METHODS

The paleontological material examined in the present study is deposited in the following collections:

– the collections 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 collection of Andris Bukejs (Daugavpils, Latvia) [ACAB] maintained at the Institute of Life Sciences and Technologies, Daugavpils University (Daugavpils, Latvia).

The amber pieces were polished manually with emery papers of different grit sizes, allowing improved views of the included specimen, and were not subjected to any supplementary fixation.

The holotype of the new species was studied using a Nikon SMZ 745T stereomicroscope. The images were taken using a Canon 90D camera with an attached Canon MPE-65 mm macro lens. 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 were made using an ocular micrometer in a stereomicroscope.

The following references were used for the generic attribution and comparison with extinct taxa: Dajoz (1984), Ivie et al. (2016), and Alekseev et al. (2024).

SYSTEMATIC PALEONTOLOGY

Family Zopheridae Solier, 1834
Subfamily Colydiinae Erichson, 1842
Tribe Synchitini Erichson, 1845

Genus *Paha* Dajoz, 1984
Type species: *Paha guadalupensis* Dajoz, 1984

Taxonomic assignment. The studied inclusion is placed in the tribe Synchitini within the subfamily Colydiinae based on the combination of the following characters: (1) dorsally concealed antennal insertions; (2) antennae clubbed, lacking scale-like setae; (3) procoxal cavities open posteriorly; (4) all tarsi tetramerous, with no tarsomeres not dilated; (5) protibiae without apical spurs; and (6) metacoxae narrowly separated by triangular process of abdominal ventrite 1. The new extinct species belongs to the genus *Paha* based on: 10-segmented antennae with 1-segmented, rounded club; antennal groove ventrad eye absent; antennomere 3 not twice as long as antennomere 4; scutellary striole absent; dorsum lacking obvious pubescense (setation short and fine, visible under high magnification only); pronotal disc with elevated central area limited by two parallel longitudinal carinae; odd elytral intervals carinate; and elytral striae with rows of elongate granules.

***Paha groehni* sp. nov.**
(Figs 1–2, 3A)
Type material. Holotype: No. GPIH no. 5244, CCGG no. 8722 (ex coll. Jonas Damzen JDC-13997R); “Holotype / *Paha groehni* sp. nov. / Bukejs et Alekseev des. 2025” [red printed label]; adult, sex unknown. A complete beetle with exposed distal part of metathoracic wing included in

a transparent, yellow amber piece with 25×17 mm and a maximum thickness of 6 mm, preserved without supplementary fixation. Ventral side of head and prosternum partially obscured by milky cover. Syninclusions: few stellate Fagaceae trichomes, and small organic particles.

Fig. 1. *Paha groehni* sp. nov., holotype, GPIH no. 5244: A – habitus, dorsal view; B – habitus, ventral view. Scale bars = 0.25 mm.

Stratum typicum. Rovno amber, late Eocene (Perkovsky et al. 2007).

Locus typicus. Rivne Oblast (region), Ukraine.

Description. Measurements: total body length (from anterior margin of head to elytral apex along midline) 1.9 mm, maximum body width (across elytra) 0.8 mm; head length 0.2 mm, head maximum width (across eyes) 0.4 mm; pronotum length 0.5 mm, maximum pronotum width 0.7 mm; elytra length (along elytral suture, including scutellum) 1.2 mm, elytra maximum width 0.8 mm.

Body subparallel-sided, elongate, about 2.4× as long as wide, weakly convex dorsally and ventrally, unicolorous black (as preserved). Pubescence: head, pronotum and elytra sparsely covered with inconspicuous, curved, semierect.

Head prognathous, transverse; densely granulose dorsally, each round granule bearing short seta. Anterior margin of clypeus widely rounded. Compound eyes small, convex, hemispherical, without interfacetal setation. Antennal insertions concealed dorsally; antennal grooves ventrad eye apparently absent. Antennae short, extending slightly beyond anterior one-third of pronotal length; 10-segmented with distinct 1-segmented antennal club, antennal club with fine suture between completely fused antennomeres 10 and 11; scape almost invisible from above, wide, subcylindrical; pedicel cylindrical, slightly transverse, about as wide as scape; antennomere 3 subconical, weakly elongate, slightly longer than antennomere 4; antennomeres 4–8 subequal in size and shape, trapezoidal, slightly dilated apically, about as long as wide; antennomere 9 trapezoidal, dilated apically, weakly transverse, antennomere 10 widest, widely oval, with widely rounded apex, nearly as long as wide, about 2× wider than antennomere 9.

Pronotum transverse, 1.4× as wide as long, widest near midlength, weakly narrowed anteriad and posteriad; pronotal surface coarsely covered with rounded granules. Pronotal disc with elevated central area delimited by two parallel, longitudinal, weakly curved carinae in form of longitudinally elongated letter S. Elevated area almost flat, with longitudinal shallow impression along midline. Anterior pronotal margin concave in dorsal view; posterior margin rounded medially, shallowly concave laterally; lateral margins subparallel, slightly rounded, finely serrate. Anterior angles distinctly prominent, rounded, nearly rectangular at apex; posterior angles almost rectangular, rounded. Prohypomera densely granulate. Prosternum convex. Intercoxal prosternal process elongate, extending apparently beyond posterior margin of procoxae, slightly dilated in anterior one-third, rather wide, wider than diameter of procoxa. Procoxal cavities apparently open posteriorly.

Scutellar shield minute, nearly cordiform.

Elytra almost parallel-sided in anterior three-quarters of length and tapered at apex, about 1.5× as long as wide combined, weakly convex, carinate, 2.4× longer than pronotum. Humeral angles rounded, weakly serrate. Elytra striate-punctate. Scutellary striole absent. Elytral striae with rows of elongate granules; odd elytral intervals (1, 3, 5, and 7) carinate. Epipleura well-developed, widest in basal half, slightly narrowing posteriad, reaching apparently elytral apices, densely covered with round granules. Meso- and metaventrites densely and coarsely punctate. Mesocoxal cavities closed. Metanepisternum narrow, about

6.5× as long as wide, densely punctate, with lateral margins slightly emarginated, anterior margin oblique. Metaventrite with disc almost flat, slightly longer than abdominal ventrite 1; discrimen distinct in posterior half. Relative length ratio of pro- to meso- to metaventrite to abdomen approximately equal to ?2.5:1.5:3:8. Metathoracic wings present.

Legs rather short and robust, finely punctate and sparsely setose. Procoxa small, nearly rounded, and widely separated by procoxa; mesocoxae subcircular, separated by 0.7× diameter of mesocoxa; metacoxae widely oval, transverse, narrowly separated by about 0.5× longitudinal diameter of metacoxa. Femora narrowly oval, flattened, widened medially; femora slightly longer than tibiae. Tibiae slightly curved, with short, fine setae apically; protibiae without apical spurs. Tarsal formula 4-4-4; tarsomeres not dilated, with sparse, fine setation ventrally; tarsomere 4 longest, longer than tarsomeres 1–3 combined, slightly curved. Claws simple, large, about 0.5× as long as tarsomere 4, robust.

Abdomen with five visible ventrites, abdominal sutures distinct throughout length; densely covered with large punctation, distance between punctures distinctly smaller than diameter of one puncture. Relative length ratios of ventrites 1–5 equal to 14:8:7:5:7. Abdominal ventrite 1 with small, narrow, triangular intercoxal process with rounded apex. Abdominal ventrite 5 with widely rounded apical margin.

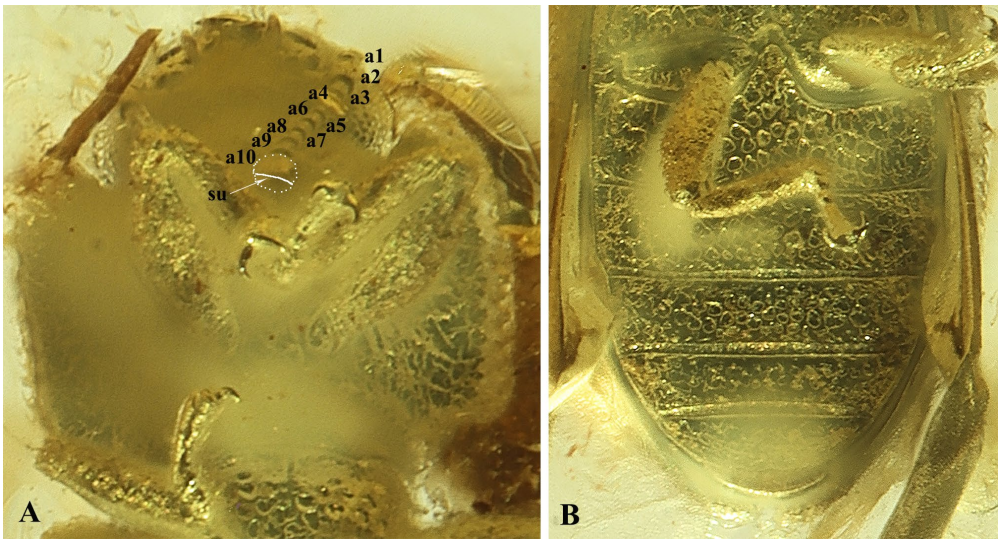

Fig. 2. *Paha groehni* sp. nov., holotype, GPIH no. 5244: A – details of forebody, ventral view; B – abdomen. Abbreviations: a1–a10 – antennomeres 1–10 respectively; su – suture. Not to scale.

Differential diagnosis. The new species can be easily distinguished from the described extinct Colydiinae preserved in Baltic amber based on the combination of generic characters, most obviously in the presence of 10-segmented antennae with 1-segmented club, short and inconspicuous setation of pronotum and elytra, pronotal disc with elevated central area and two

longitudinal carinae, scutellary striole lacking, and odd elytral intervals carinate.

Paha groehni sp. nov. can be distinguished from the Baltic amber congener, *P. vanivanitatum*, in the smaller body size (body length = 1.9 mm in contrast to 2.4 mm in the holotype of *P. vanivanitatum*), and in characters of pronotum (Fig. 3): (1) longitudinal pronotal carinae curved anteriorly and posteriorly, elongately S-shaped (almost straight in basal part in *P. vanivanitatum*, see Fig. 3B); (2) concave anterior pronotal margin and widely rounded posterior pronotal margin (widely rounded and convex anterior pronotal margin and almost straight posterior pronotal margin in *P. vanivanitatum*; and (3) anterior pronotal angles prominent, nearly rectangular (slightly prominent and rounded in *P. vanivanitatum*).

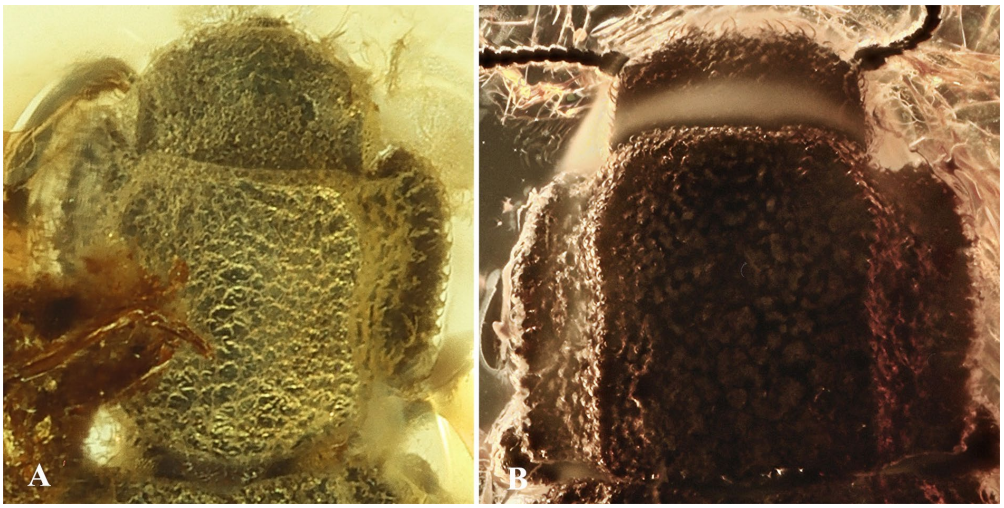

Fig. 3. Fossil *Paha*, pronotum, dorsal view: A – *P. groehni* sp. nov., holotype, GPIH no. 5244; B – *P. vanivanitatum* Alekseev & Bukejs, 2024, holotype, ABAC 064 [ACAB]. Not to scale.

Paha groehni sp. nov. differs from extant congeners in the combination of the following characters: unicolorous black dorsum (in contrast to obsolete reddish elytral pattern in *P. laticollis*), comparatively wide pronotum (just about 1.1× as wide as long in *P. guadalupensis,* and about 1.2× as wide as long in *P. laticollis*), and shallowly impressed median area on pronotum (distinctly oval shallow medial impression in *P. guadalupensis*).

Derivatio nominis. The specific epithet is a patronym formed from the surname of Mr. Carsten Gröhn (Glinde, Germany), an enthusiast and specialist in Baltic amber.

ACKNOWLEDGEMENTS

We are sincerely grateful to Carsten Gröhn (Glinde, Germany) for the loan of the type material, and to Aleksej and Jonas Damzen (Vilnius, Lithuania) for photographic preparation and continuous assistance during our amber research. Two anonymous reviewers are thanked for their helpful comments and efforts to improve our manuscript.

REFERENCES

Alekseev V.I., McKellar R.C., Bukejs A. 2024. A revision and addition to Zopheridae (Coleoptera: Tenebrionoidea) in Baltic amber: possible connections between modern Holarctic distributions and Eocene 'amber forests'. *Zootaxa 5536 (2): 201–247*.

Dajoz R. 1984. Note sur quatre genres de Coléoptères Colydiidae: *Nematidium* Erichson, *Monoedus* Horn, *Lobogestoria* Reitter et *Paha* n. gen. *Bulletin Mensuel de la Société Linnéenne de Lyon 53 (4): 145–157*.

Ivie M.A., Lord N.P., Foley I.A. 2016. Colydiine genera (Coleoptera: Zopheridae: Colydiinae) of the new world: a key and nomenclatural acts 30 years in the making. *The Coleopterists Bulletin 70 (4): 755–788*.

Perkovsky E.E., Zosimovich V.Yu., Vlaskin A.P. 2003. Rovno amber insects: first results of analysis. *Russian Entomological Journal 12 (2): 119–126*.

Perkovsky E.E., Rasnitsyn A.P., Vlaskin A.P., Taraschuk M.V. 2007. A comparative analysis of the Baltic and Rovno amber arthropod faunas: representative samples. *African Invertebrates 48 (1): 229–245*.

Received: 07.08.2025
Accepted: 01.12.2025