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# A new genus of Erotylidae from Eocene amber (Coleoptera: Clavicornia)

# Новый род ископаемых жуков-грибовиков (Coleoptera: Clavicornia: Erotylidae)

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КЛЮЧЕВЫЕ СЛОВА: Erotylidae, *Xenohimatium,* таксономия, поздний эоцен, ровенский янтарь.

ABSTRACT**.** Based on a fossil specimen from the Late Eocene Rovno amber (Ukraine), the Eocene species and genus *Xenohimatium rovnense* **gen.n., sp.n.**, is described. The new genus is similar to the extant *Xenoscelis,* differing in procoxal cavities partially open behind; lateral carina on elytra absent; pronotum shorter, without strong excision on anterior margin.

РЕЗЮМЕ. Из позднеэоценового ровенского янтаря (Украина) описан *Xenohimatium rovnense* **gen.n., sp.n.** Новый род наиболее близок к современному *Xenoscelis*, отличается от него частично открытыми сзади передними тазиковыми впадинами, отсутствием боковых килей на надкрыльях, более короткой переднеспинкой, без вырезки по переднему краю.

## Introduction

The family Erotylidae is a group of small and medium size beetles with about 3200 described species in about 280 genera, represented in all biogeographic realms [Wegrzynowicz, 2002; Leschen, 2003]. The classification of the family was most recently revised by Leschen [Leschen & Wegrzynowicz, 1998; Leschen, 2003], who included the family Languriidae in Erotylidae. The family Erotylidae includes six subfamilies (Xenoscelinae, Pharaxonothinae, Loberinae, Languriinae, Cryptophilinae, and Erotylinae).

Biology of Erotylidae remains very poorly known. Subfamily Erotylinae is mostly mycophagous, while subfamily Languriinae includes phytophagous species. Other subfamilies (Xenoscelinae, Pharaxonothinae, Loberinae, Cryptophilinae) are predominantly mycophagous. Both adults and larvae are commonly found on fungi and under the bark of weakened trees and dead wood, many species feeding on plant debris in forest litter. For example, *Cryptophilus* Reitter, 1874 and *Loberus* Leconte, 1861 occurs in leaf litter and mouldy vegetation, and *Leucohimatium* Rosenhauer, 1856 is associated with grain crops, feeding on parasitic fungi and smut spores. Other genera are phytophagous or saprophagous, and some species of *Xenocryptus* Arrow, 1929, *Pharaxonotha* Reitter, 1875, and *Hapalips* Reitter, 1877 have been found feeding on the pollen of cycads [Windsor et al., 1999; Leschen & Buckley, 2007].

Some species are commensals [Leschen & Buckley, 2007]: *Loberopsyllus* Martinez & Barrera, 1966 is associated with rodents [Barrera, 1969; Leschen & Wegrzynowicz, 1998; Leschen & Ashe, 1999], *Macrophagus* Motschulsky, 1845 had been collected from nests of bees; *Anthophora* Latreille, 1803, *Halictus* Latreille, 1804 [Horion, 1960], *Chasmatodera* Arrow, 1943 and *Bancous* Pic, 1946 (Erotylinae) are found in the nests of social insects [Skelley, 1999; Maryama, 2004], and some erotylid beetles live with fungus-growing termites. *Lepidotoramus* Leschen, 1997 (Cryptophilinae) may be endoparasitic on lepidopteran pupae [Leschen, 1997]; *Nomotus* Gorham, 1887 (Languriinae) aggregates with lepidopteran pupae [Windsor et al., 1999].

Late Eocene Rovno amber represents a southern coeval analogue of the famous Baltic amber [Perkovsky et al., 2007; Perkovsky et al., 2010], collected in the northwest of Ukraine. The beetle was found in the sample collected in Klesov or Dubrovitsa in 1999–2000 [Perkovsky et. al., 2007].

### Palaeontological data

Palaeontological data concerning the family Erotylidae were reported by Wegrzynowicz [2002]. A few species of the genera *Tritoma* Fabricius, 1775 and *Dacne* Latreille, 1796 have been described from Dominican amber, as well as some *Cryptophilus*, *Dacne*, *Tritoma* (Baltic amber) and *Erotylus* Fabricius, 1775 (copal) [Poinar, 1992; Skelley, 1997; Spahr, 1981 a,b]. Palaeontological data concerning the subfamily Xenoscelinae or Pharaxonothinae are not available.

Rovno amber is southern coeval analogue of the famous Baltic amber [Perkovsky et al., 2007; Perkovsky et al., 2010]. Amber collection of the Schmalhausen Institute of Zoology NAN of Ukraine (SIZK) contains more than 1000 inclusions of beetles from Late Eocene Rovno amber.

Photographs were taken at the Paleontological Institute, Russian Academy of Sciences (Moscow) by A.V. Mazin and the second author at the microscope Leica MZ 16 and by A. P. Rasnitsyn at microscope Leica M 165.

## Identification of the fossil

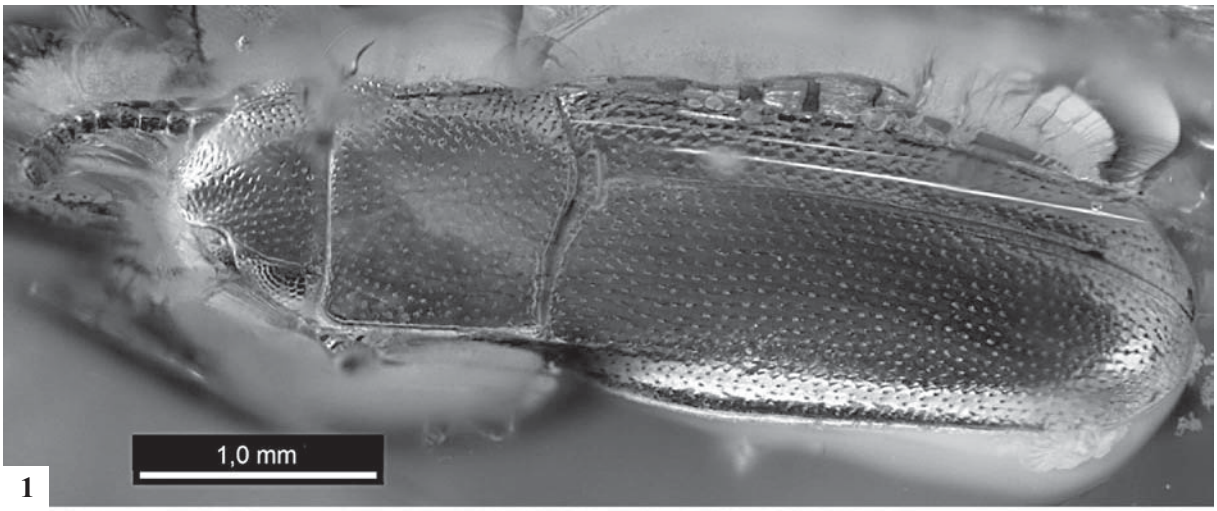
Narrowly elongate, flattened, setose, and reddish brown in colour. Head large; eyes coarsely facetted; lateral pronotal margins simple without crenulate or callosities; tarsi without setose lobes beneath; elytral epipleura well-developed and complete; ventrite 1 not much longer than 2.

Antennae with 11 segments and a 3-segment club. Supraocular line present. Mesocoxae separated by ca. 0.4–1.0 times of coxal width. Mesocoxal cavities laterally closed by the metaventrite. Tarsal formula: 5–5–5. Epipleuron complete to apex of elytron. Number of ventrites: 5. Abdominal ventrite 1 equal in length to ventrite 2. Consequently, it is placed in the Erotylidae.

Unfortunately, many important characters are not visible (for example, lateral pockets on the mentum, or tarsal shelf of tarsomere 5).

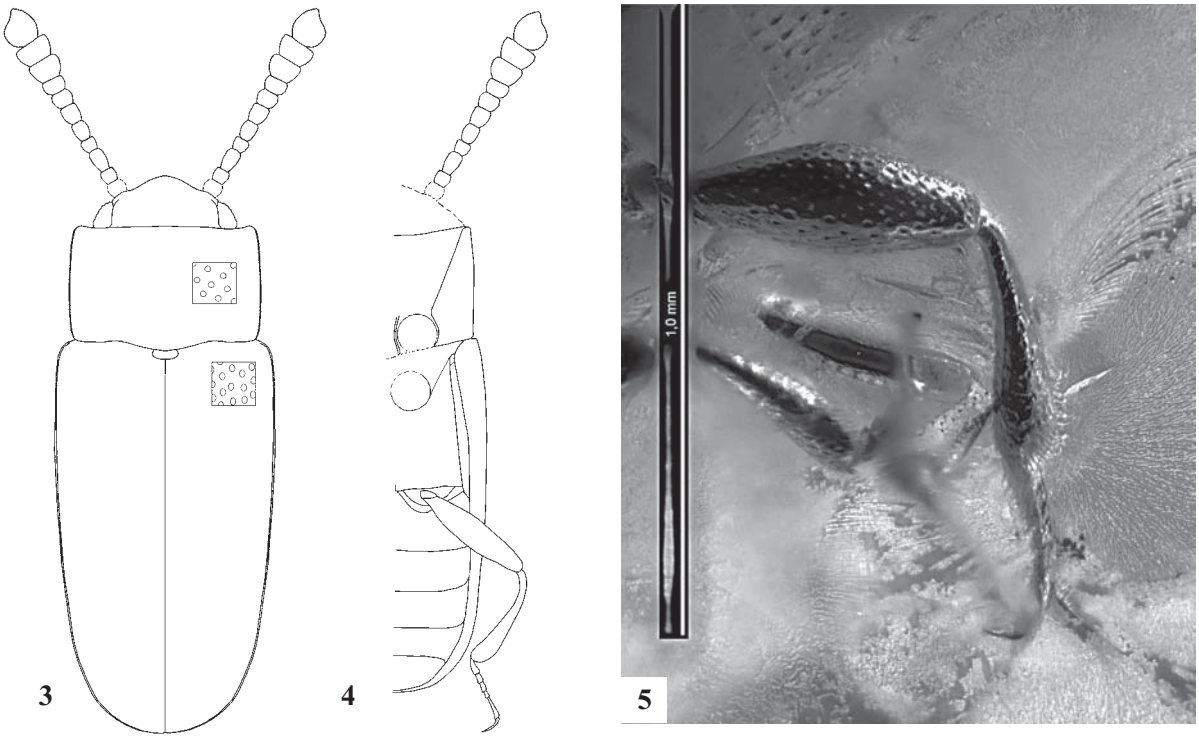
The new genus is related to ones from the basal branch of the family Erotylidae, formerly grouped with Languriidae (Xenoscelinae sensu lato, probably Xenoscelinae or Pharaxonothinae).

The new genus is placed in the subfamily Xenoscelinae based on the following characters: basal pronotal





Figs 1–5. *Xenohimatium rovnense* **sp.n.**, habitus: 1 — laterodorsal view; 2 — lateroventral view.
Рис. 1–5. *Xenohimatium rovnense* **sp.n.**, внешний вид: 1 — сбоку и сверху; 2 — сбоку и снизу.




Figs 3–5. *Xenohimatium rovnense* **sp.n.:** 3–4 — habitus; 5 — hind tarsus; 3, 5— dosal; 4 — ventral.
Рис. 3–5. *Xenohimatium rovnense* **sp.n.** 3–4 — внешний вид; 5 — задняя лапка; 3, 5 — сверху; 4 — снизу.

pits absent, partial externally-closed procoxal cavities, tarsomeres not strongly lobed below, elytra with closely spaced rows of punctures, appears covered by confused punctuation, and submesocoxal lines absent.

Family Erotylidae Latreille, 1802

Subfamily Xenoscelinae Ganglbauer, 1899

*Xenohimatium* Lyubarsky et Perkovsky **gen.n.**

Type species: *Xenohimatium rovnense* **sp.n.**

DIAGNOSIS**.** Supraocular line present. Antenna with 11 antennomeres and a 3-segmented club. Antenna long and reaching beyond middle of pronotum. Antennal club not flattened. Antennal insertion not exposed in dorsal view.

Pronotum completely parallel-sided. Anterior angles of pronotum poorly developed, pronotal callosity absent. Lateral margin of pronotum not serrate, smooth. Dorsal punctation weak, dorsum subglabrous. Anterior edge of prosternum almost smooth. Pronotal pits absent.

Internal closure of procoxal cavity slightly open. Width of mesoventral process narrower than mesocoxa. Submesocoxal lines absent. Metepisternal ctenidium present.

Tarsi 5–5–5. Length of tarsomere 1 greater than tarsomere 2. Tarsomeres 2 and 3 not lobed. Tarsomere 4 not reduced.

Scutellum transverse. Elytral punctation striate. Elytra narrowly explanate. Humeral spine absent. Epipleuron complete to apex of elytron.

Abdominal ventrites 1 and 2 free.

COMPARISON. Differs from genera of the family Erotylidae (Xenoscelinae, Pharaxonothinae):

— from genus *Leucohimatium* in the absence of callosity on the anterior angles of pronotum;
— from genera *Loberonotha* Sen Gupta et Crowson, 1969*, Macrophagus,* and *Othniocryptus* Sharp, 1900 by rows of punctures of elytra, and weak pubescence of the body;
— from genera *Pharaxonotha, Henoticonus* Reitter, 1878*, Xenocryptus,* and *Zavaljus* Reitter, 1880 by pronotum completely parallel-sided;
— from genus *Loberogosmus* Reitter, 1876 by pronotal pits absent, metepisternal ctenidium present, tarsomere 3 not lobed;
— from genus *Xenoscelis* Wollaston, 1864 by procoxal cavities partially open behind; lateral carina on elytra absent; pronotum shorter, and without strong excision on anterior margin.

New genus is related to Xenoscelinae sensu lato, close to Xenoscelinae. Unfortunately many characters are not visible, for example structure of mouth parts, vertexal line, hind wing etc.

ETYMOLOGY. The genus name is grammatically neuter. It is compounded from parts of two other genus names, *Xenoscelis* and *Leucohimatium.*

*Xenohimatium rovnense* Lyubarsky et Perkovsky **sp.n.**
Figs 1–5

MATERIAL**.** Holotype, SIZK UA-449, Rovno amber, Late Eocene. Syninclusions: 3 Acari (2 *Glaesacarus*); Homoptera: Ortheziidae.

DESCRIPTION**.** Body elongate-oval, length 2.6 mm. Colour light-brown.

Head and pronotum with very short hairs. Size of eye less than half length of head. Diameter of facet equal to 0.001 mm. Shape of eye hemispherical. Punctuation of head: punctures medium in size, distance between neighbouring punctures equal to one diameter of puncture.

Pronotum without callosity and teeth, width to length ratio 1.55. Width of pronotum greater than its length, not narrower than the combined width of the elytra. Anterior margin of pronotum without deep excavation, only slightly sinuated. Lateral margins are parallel. Punctuation with small punctures, the distance between them is 1.0–1.5 diameter of puncture. Prono-

tum slightly shagreened. Length of pronotum relative to length of elytra 0.33. Posterior angles obtuse. Basal furrow absent.

Legs slender, length of posterior tarsus shorter than length of posterior tibia. Length of posterior tarsus comparative to length of middle tarsus: equal.

Elytral pubescence short. Length of hair less than breadth of scutellum. Elytra covered by rows of punctures, distance between neighbouring punctures equal to 2 diameters of puncture.

Elytral length 1.8 times greater than width. Tooth on schoulder absent. Sutural stria extending beyond the middle of the disk. Epipleuron visible from above.

ETYMOLOGY**.** *Rovnensis* (neuter: *Rovnense*) is the traditional Latin adjective meaning "related to the city (or Oblast, or Region) of Rivne (Rovno)".

REMARKS. Although reliable data on biology of *Xenohimatium* **gen.n.** are absent, an analysis of some structural features of the beetle allows to make some conclusions. If reconstruction of Leschen and Buckley [Leschen & Buckley, 2007] of the primary diet of Erotylidae is true, we should assume that the new genus, placed at the root of the erotylid tree, was characterized by microfungal feeding or saprophagy, or pollen feeding. As for relations with plant associations, the primitive erotylids were associated with cycads and conifers [Leschen & Buckley, 2007].

For example, *Pharaxonotha confusa* Pakaluk occurs in *Zamia fairchildiana* cones in Costa Rica [Pakaluk, 1988], and congeners are known to be associated with other *Zamia* in Florida and Mexico [Tang, 1987; Vovides, 1991]; *Xenocryptus tenebrioides* Arrow, 1929 occurs in *Macrozamia* cones. *Hapalips* sp. in male *Cycas* cones in Australia [Ornduff, 1991]; *Nomotus* spp. feed on *Zamia* leaves [Windsor et al., 1999].

Leschen and Buckley [Leschen, 2006; Leschen & Buckley, 2007] hypothesize about changing food preferences of the family Erotylidae and general directions of the evolution of the group. There is a network of transitions connecting the microfungal diet original for the group and derived types of saprophagy, pollenophagy, phytophagy, and feeding on dead wood. These authors believe that the evolution of the family Erotylidae was closely associated with cycads (Cycadales) [Jolivet, 2005]. However, as it turns out, cycads are now considered a relatively young group. Cycads are thought to have undergone a near-synchronous global rediversification beginning in the late Miocene, followed by a slowdown toward the Recent [Nagalingum et al., 2011; Renner, 2011]. A variety of cycads have passed through the bottleneck of 10–12 million years ago, which may affect our understanding of the evolution of the associated Erotylidae and other groups of Coleoptera.

Fossil Eocene cycads are known from Fushun in Northern China (famous by its amber fauna), Japan and Australia. Interestingly, the new erotylid is found with an ortheziid female, never found previously with other Rovno amber beetles; coccids are known as important pests of cycads.

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