

# The First Record of the Subfamily Xenoscelinae (Coleoptera, Erotylidae) from the Baltic Amber

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**Abstract**—The first Erotylidae of the subfamily Xenoscelinae from the Late Eocene Baltic amber, *Warnis tvanksticus* gen. et sp. nov., is described. The new genus is distinguished from closely related *Xenoscelis* Woll. and *Zavaljus* Reitt. by the presence of well-developed femoral lines on the first abdominal ventrite and also the shape of the pronotum, the body size, the absence of lateral carina on the elytra or pits at the base of the pronotum, and the presence of a gular pit.

**Keywords:** Coleoptera, Erotylidae, new genus, Baltic amber, Eocene

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## INTRODUCTION

The family Erotylidae is relatively rare in the Eocene Lagerstätten. Four Erotylidae genera have been recorded in the Baltic amber (Klebs, 1910; Spahr, 1981; Lyubarsky and Perkovsky, 2012; Alekseev, *in press.*); from the Saxon amber, only one species of the subfamily Erotylinae Latreille, *Triplax contienensis* Alekseev, has been described. One peculiar genus with one species, *Xenochimatium rovnense* Lyubarsky et Perkovsky, 2012, of the subfamily Xenoscelinae Ganglbauer was described from Late Eocene Rovno amber (southern analogue of the Baltic amber). Additionally, four species of *Tritoma* (Wickham 1912, 1914, 1916) were described from the Upper Eocene Florissant Formation (Colorado), and *Mycotretus binotatus* Scudder, 1878 was described from the Lower Eocene Green River Formation (Scudder 1878, 1900).

The family Erotylidae includes over 200 genera and over 3500 species (Węgrzynowicz 2002; Leschen 2003) with worldwide distribution, reaching the greatest diversity in the tropical regions of Asia, Africa, Central and South America. In the present study, we adhere to a broad understanding of the family and its division into six subfamilies (Leschen 2003; Bouchard et al. 2011), which are the following: Xenoscelinae Ganglbauer, Pharaxonothinae Crowson, Loberinae Bruce, Languriinae Hope, Cryptophilinae Casey, and Erotylinae Latreille (including five tribes: Dacnini Gistel, Encaustini Crotch, Erotylini Latreille, Megalodacnini Sen Gupta, and Tritomini Curtis).

Trophic links of pleasing fungus beetles were described in a series of studies (Sen Gupta and Crowson 1967; Goodrich and Skelley 1994; Leschen and Buckley 2007; Franz and Skelley 2008; Hilszczanski et al. 2014). In general, it is possible to conclude that the Languriinae are mostly phytophagous and other groups of Erotylidae are mostly mycophagous associated with micromycetes, which are assumed an initial food source for this family. Several genera of the family Erotylidae are palinophages (*Pharaxonotha*, *Loberonotha*, etc.); some can develop inside hymenopteran nests (*Macrophagus*, *Zavaljus*) and occur underneath tree bark or stones (*Xenoscelis*), and feeding on basidiomycete is typical for imago (and presumably larvae) of members of the subfamily Erotylinae.

In the present study, a new genus of pleasing fungus beetles (subfamily Xenoscelinae) from Late Eocene Baltic amber is described.

## MATERIALS AND METHODS

During the processing of the Christel and Hans-Werner Hoffeins (CCHH) private collection of Baltic amber inclusions, an imago of the family Erotylidae (CCHH, no. 1222-2) was discovered, which is the subject of the present report. The holotype will be transferred to Senckenberg Deutsches Entomologisches Institut (Munich, Germany) for permanent storage. Transparent yellow amber with the inclusion was treated by hand and embedded in colorless epoxy resin sculptured into a parallelepiped according

to the technique described by Hoffeins (2001). Judging from the condition of the inclusion, the amber piece probably underwent autoclaving, which resulted in darkening and slight distortion of the beetle.

Photographs were taken by C. and H.–W. Hoffeins, using a Nikon Coolpix 4500 camera on a Wild M3Z microscope (no. 1222–2). Figures were prepared by hand during the study of inclusions, scanned and later edited using Adobe Photoshop CS8.

During morphological description and genus diagnosis, studies of Sen Gupta and Crowson (1967), Węgrzynowicz (2002), Leschen (2003), Skelley (2003; 2009), and Dai and Zhao (2013) were used.

## SYSTEMATIC PALEONTOLOGY

### Family Erotylidae Latreille, 1802

#### Subfamily Xenoscelinae Ganglbauer, 1899

#### Genus *Warnis* Lyubarsky, Perkovsky et Alekseev gen. nov.

**Etymology.** From the Old Prussian *warnis* (raven). Raven is a symbol of the Prussian army, a messenger of gods and companion of armies, patron of Prussian soldiers. Masculine gender.

**Type species.** *Warnis tvanksticus* sp. nov.

**Diagnosis and remarks.** The new genus is assigned to the family Erotylidae based on the following features: 11-segmented antenna with a 3-segmented club; the procoxa separated by the projection of the prothorax; long elytral epipleura; abdomen with five visible sternites; the first visible abdominal sternite is approximately as long as the second; all tarsi are 5-segmented. According to Leschen (2003) revision, the following set of features present in the studied specimen is typical for the subfamily Xenoscelinae: the antennal sockets hidden from above; anterior angles of the pronotum not protruding forward; procoxal cavities closed internally; narrow mesothoracic process; monocondylous connection of meta- and mesothorax; absence of mesocoxal femoral lines; elytral punctuation present; first tarsomere is not shorter than the second. The new genus differs from other subfamilies with dicondylous or linear connection of the meta- and mesothorax (Cryptophilinae and Erotylinae), reduced fourth tarsomere (Languriinae and Pharaonothinae) in the widened third tarsomere (Lobarinae), tarsomeres with lobes, and the antennal bases visible from above (Languriinae). A number of important features (hind wing venation, structure of genitals, detailed structure of mouthparts, detailed structure of the prothorax in the procoxal region) were

unfortunately inaccessible for study. Based on the visible morphological structures, the specimen was identified as a member of the subfamily Xenoscelinae. According to revision by Leschen (2003), the subfamily Xenoscelinae includes seven genera: *Loberonotha* Sen Gupta et Crowson (one species, New Zealand), *Macrophagus* Motschulsky (one species, Central and Eastern Europe, Caucasus, and Central Asia), *Othniocryptus* Sharp (one species, Central and South America), *Protoloberus* Leschen (one species, Australia, Queensland, and New South Wales, most of the specimens come from rainforests), *Xenocryptus* Arrow (two species, South Africa and Australia), *Xenoscelis* Wollaston (three species, Mediterranean), and *Zavaljus* Reitter (one species, North and Eastern Europe). During the last decade, Xenoscelinae genera were described from tropical Africa (*Arrowcryptus* Leschen et Węgrzynowicz, 2008; two species) and from the Rovno amber (*Xenochimatium* Lyubarsky et Perkovsky, 2012). Comparisons with nine aforementioned genera of the subfamily allow us to establish a new genus, *Warnis* gen. nov.

**Comparison.** The new genus is distinguished from *Arrowcryptus*, *Loberonotha*, *Macrophagus*, *Othniocryptus*, *Xenochimatium*, *Xenocryptus*, and *Xenoscelis* by the presence of a gular pit. In addition it differs from the genus *Xenocryptus* in the structure of tarsi (three basal tarsomeres of *Xenocryptus* are widened, while the fourth is shortened) and in the shape of the pronotum (which is transverse and distinctly narrowing anteriorly and posteriorly in *Xenocryptus*). The new genus differs from *Loberonotha*, *Macrophagus*, and *Othniocryptus* in the regular elytral punctuation rows (whereas elytral punctuation in the three genera compared is confused); from *Protoloberus*, in the unreduced fourth tarsomere; and from *Arrowcryptus*, in the shape of pronotum and flattened, almost parallel elytra, etc.

#### Key to Genera of the Subfamily Xenoscelinae

1. Pronotum completely parallel-sided.....2  
—Pronotum widest within apical one-third.....3
2. Procoxal cavities closed completely posteriorly. Lateral carina on elytra present. Pronotum considerably elongated (Pl. 3, fig. 3) Mediterranean.....  
.....*Xenoscelis* Wollaston, 1864  
—Procoxal cavities open partially posteriorly. Lateral carina on elytra absent. Pronotum transversal.....  
.....*Xenochimatium* Lyubarsky, Perkovsky
3. Elytral punctuation confused.....4

#### Explanation of Plate 3

Xenoscelinae.

**Fig. 1.** *Warnis tvanksticus* sp. nov.: (a) holotype CCHH, no. 1222-2, general appearance, dorsal view; (b) holotype, general appearance, ventral view.

**Fig. 2.** General appearance of *Zavaljus brunneus* (Gyllenhal).

**Fig. 3.** General appearance of *Xenoscelis costipennis* (Fairmaire).



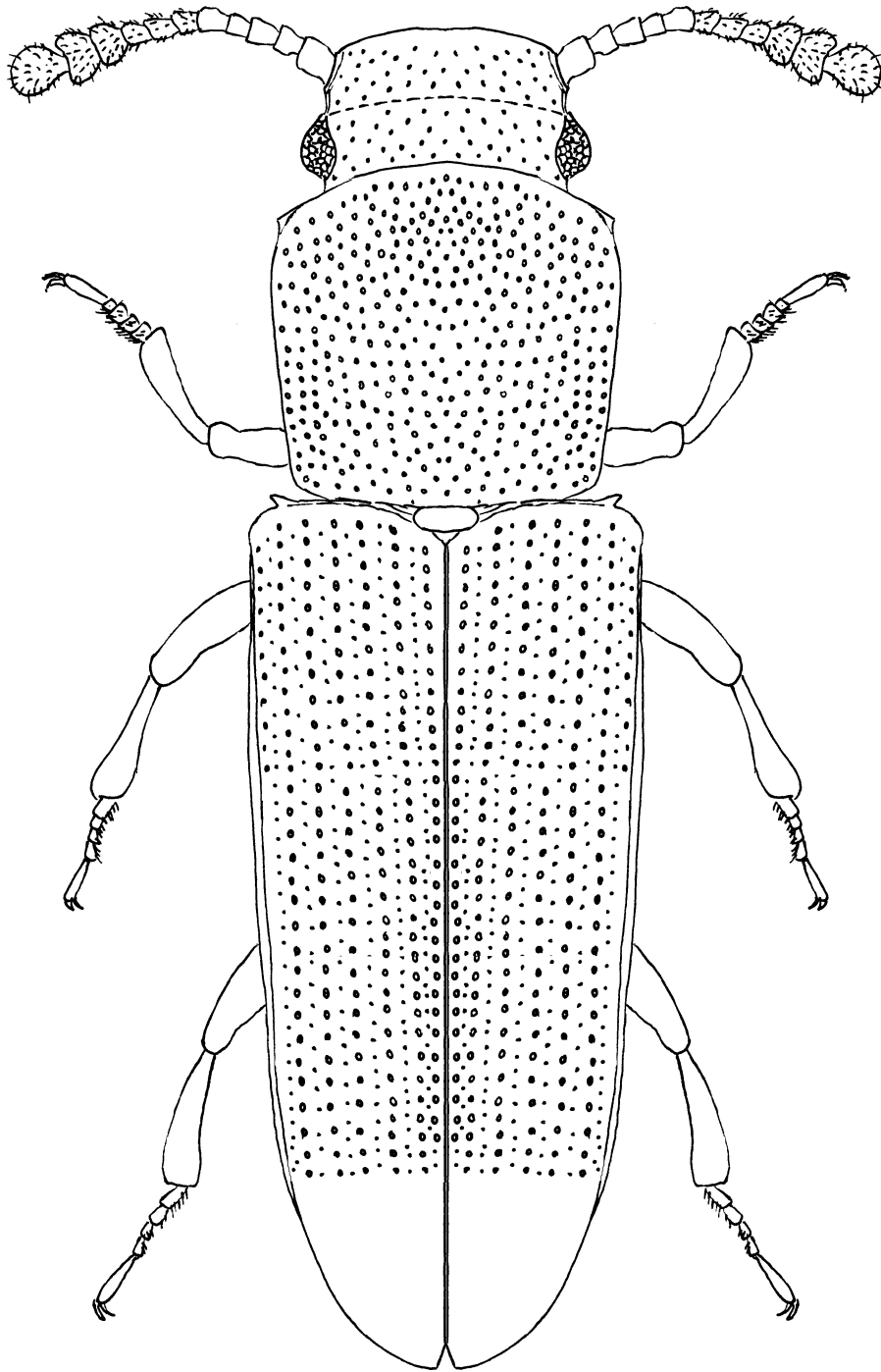


Fig. 1. *Warnis tvanksticus* gen. et sp.nov. holotype CCHH, no. 1222-2, dorsal view, reconstruction.

- |   |   |
|---|---|
| —Elytral punctuation arranged in rows.....7   | 6. Elytra are variegated. Submetathoracic lines absent. Tarsi with lobes. Central America.....  |
| 4. Epipleura widened to level of metathorax. New Zealand..... <i>Loberonotha</i> Sen Gupta et Crowson | ..... <i>Othniocryptus</i> Sharp  |
| —Epipleura widened to elytral tips.....5  | —Elytra uniform in color, blue–green. Submetathoracic lines present. Tarsi without lobes. Central Africa..... <i>Arrowcryptus</i> Leschen, Węgrzynowicz |
| 5. Body uniform in color, light brown. Central and Eastern Europe, Caucasus, Central Asia.....        | ..... <i>Macrophagus</i> Motschulsky  |
| —Body with two colors.....6   | 7. Gular pit present.....8  |

- Gular pit absent. Antenna short, reaching only middle of pronotum. Anterior angles of pronotum without processes. Australia, South Africa.....  
.....*Xenocryptus* Arrow
8. Metacoxal lines absent.....9  
—Metacoxal lines present (Fig. 3).....*Warnis* gen. nov.
9. Supraocular line present. Tarsi seem 4—segmented, because tarsomere 4 reduced. Australia.....  
.....*Protooberus* Leschen
- Supraocular line absent. Tarsi 5—segmented, tarsomere 4 not reduced (Pl. 3, fig. 2). North and East Europe.....*Zavaljus* Reitter

**Description.** Elongated, flattened body, nude, exception for short elytral chaetae and hairs on antennal club and tarsi. Head wide, eyes with normal-sized facets (approximately equal to spot diameter on pronotum). Supraocular line absent, frontoclipeal suture absent. Bases of antennae invisible from above and located on sides. Antennae 11-segmented with 3-segmented club. Gula with oval transverse pit. Pronotum narrowed slightly posteriorly. Pits at base of pronotum absent. Lateral margins of pronotum simple, smooth; anterior angles of pronotum with small triangular denticle not protruding significantly anteriorly. Prosternal process rounded oval at tip. Elytra with rows of small dots and small humeral denticle and without sutural row of dots or riblike lateral carina. Epipleura of elytra developed completely, reaching ventrite 4. Mesocoxal femoral lines absent, metacoxal lines long, straight, and clearly visible on ventrite 1. Procoxal cavities open from above. Mesocoxae closed on sides and separated by interval slightly wider than coxal diameter. Tarsi without lobes and clearly 5-segmented. Three first tarsomeres with long and rather densely spaces hairs from below, tarsomere 4 as long as tarsomere 3, only slightly narrower, not reduced.

*Warnis tvanksticus* Lyubarsky, Perkovsky et Alekseev sp. nov.

Plate 3, fig. 1; Figs. 1–3

**Etymology.** From Tvanksta (Tuwangste), an Old Prussian settlement located in place of the crusader castle Königsberg in modern central part of Kaliningrad City on the bank of the Pregola River.

**Holotype.** CCHH, no. 1222-2, inclusion in Baltic amber; Late Eocene. Sininclusions absent. Left antennomere 11 absent. The beetle is slightly distorted, with shallow and asymmetrical dents in cuticle on the dorsal and ventral sides of the body. Presumably male (protarsi widened).

**Description.** The body is black, uniform in color. Eyes are small hemispherical. The antennae are thick, with 3-segmented nonflattened club reaching the middle of the pronotum. The antennae are covered with short hair, which are relatively long hairs on three antennomeres of the club. The base of antennomere 1 is invisible from above; the antennal pit is located on the side. The tip antennomere is cut and rounded. Antennomere 1 is larger than each succeeding anten-



**Fig. 2.** *Warnis tvanksticus* gen. et sp. nov. holotype CCHH, no. 1222-2, hind tarsus.

nomere of the pedicel; antennomere 9 is transversely conical and equal in length to antennomere 10; antennomere 11 is rounded.

The pronotum is flat and reaches its greatest width in the anterior quarter. The length-to-width ratio is 1 : 1. The pronotum base has a thin curved ridge. The posterior angles of the pronotum are obtuse. The lateral margin of the pronotum is thinly fringed and smooth. The posterior margin of the pronotum is slightly biconcave; the anterior margin is slightly convex. Punctuation is weak, but rather dense, with the space between dots 1–1.5 of their diameter. Punctuation on the head is also rather dense, with the spaces between dots 1–2 of the dot diameter. The length ratio of the pronotum and elytra is 0.38.

**Elytra.** The length-to-width ratio is 2.3. The humeral denticle is present. The clypeus is transverse, thrice wider than long, with rounded corners. Dorsally, the elytra have rows of small dots with very short procumbent chaetae; between rows, there is a row of smaller simple dots. The distance between dots in row 1 is approximately twice the dot diameter; the distance between rows of dots is approximately thrice the dot diameter. The rows of dots are observed throughout four-fifths of the elytral length. The hind wings are invisible.

The abdomen is nude, with fine puncture. The mesocoxal femoral lines are absent; the metacoxal femoral lines are well-developed, straight, reaching the posterior margin of the first visible abdominal sternite.

The tarsal formula is 5–5–5; the first tarsomere is longer than the second; the apical tarsomere is as long as three preceding tarsomeres. Tarsomeres are not reduced and lack lobes. The first three procoxal segments are relatively wide. Claws are long (one-third of the apical tarsomere) and simple. The procoxae and mesocoxae are approximately equal in length to each

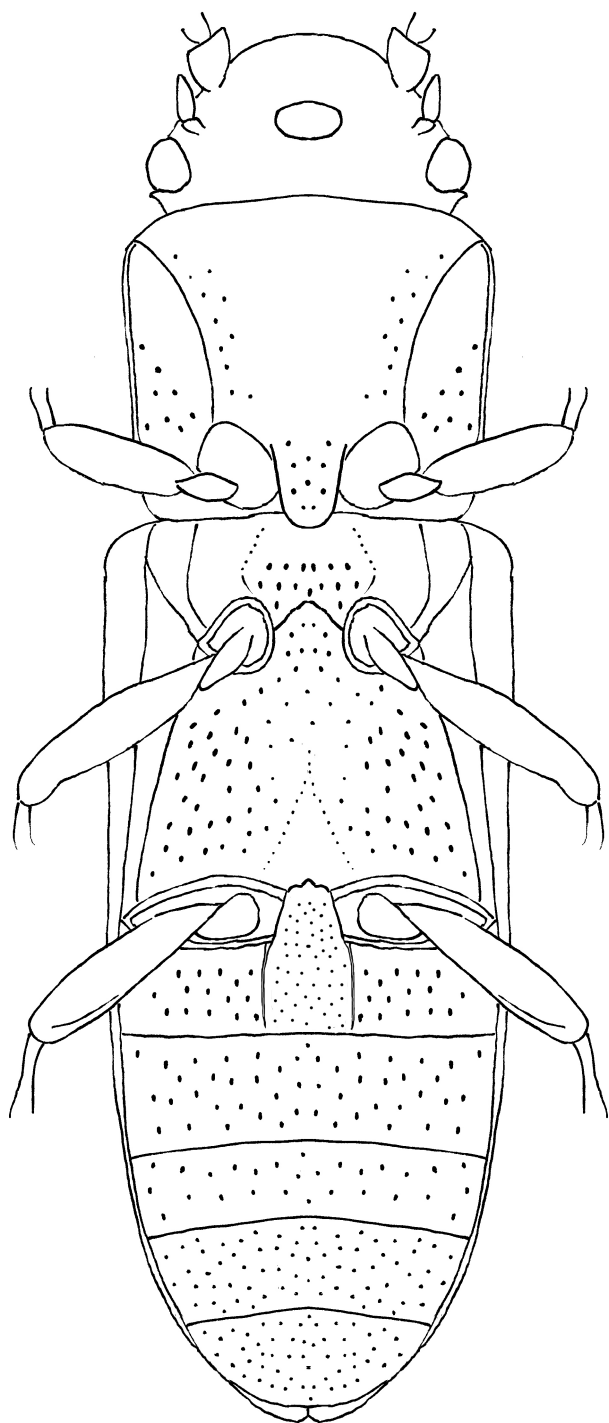


Fig. 3. *Warnis tvanksticus* gen. et sp. nov. holotype CCHH, no. 1222-2, ventral view, reconstruction.

other and to the tibiae. The tibiae are widened towards the tip and covered with short spikes.

**Measurements**, mm. Body length, 2.5; humeral width, 0.7.

**Material**. Holotype.

## DISCUSSION

The specimen in question is particularly similar in a number of morphological features to two modern Palearctic genera, *Xenoscelis* and *Zavaljus*. The new genus differs from the habitually close genus *Xenoscelis* (with an elongated and flattened body, elongated pronotum with rounded angles) in the absence of a lateral carina on elytra, the presence of well-developed femoral lines on the first abdominal ventrite, gular pit, and the pronotum narrowing slightly posteriorly. The new genus differs from *Zavaljus* in the absence of pits at the base of the pronotum, the smooth sides, the small denticle on anterior corners of the pronotum, and in the flattened and significantly smaller body. Additional features (primarily species-specific rather than genus-specific) distinguishing the new form from *Zavaljus brunneus* (Gyllenhal) are the presence of a small humeral denticle, the absence of sutural row of dots, the shape of the prosternal process (narrower and rounded oval at the tip in the new genus and wider and rounded rectangular at the tip in *Zavaljus*). The new genus is distinguished from Rovno *Xenochimatium* by the pronotum slightly narrowing towards the base (strictly parallel in *Xenochimatium*), the presence of metacoxal femoral lines on the first ventrite, and a humeral denticle on the elytra.

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