

***Cathartosilvanus perkovskyi* sp. nov. – first record of Silvanidae (Coleoptera: Cucujoidea) from Eocene Rovno amber**

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A new fossil species of the silvanid flat bark beetle genus *Cathartosilvanus* Grouvelle is described and illustrated from Upper Eocene Rovno amber. *Cathartosilvanus perkovskyi* sp. nov. resembles extant *C. opaculus* (LeConte, 1854) and differs from extinct congeners from Baltic amber in pronotal lateral sides crenulate, pronotum as long as wide, and elytral intervals partially convex. It is the first report of Silvanidae from this *Lagerstätte*.

Key words: palaeocoleopterology, silvanid flat bark beetles, new species, Cenozoic, Paleogene, fossil resin

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INTRODUCTION

The small coleopteran family Silvanidae consists of approximately 500 extant species within 58 genera and two subfamilies (Brontinae and Silvaninae) in the Recent fauna. The family is worldwide in distribution, but is most abundant at both the generic and species level in the tropics (Friedman 2015). However, the group is comparatively rare as fossils. Until now, only two Mesozoic and seven Cenozoic fossil silvanid species have been described (Alekseev & Bukejs 2016; Liu et al. 2019; Cai & Huang 2019; Alekseev et al. 2019): *Cretoliota cornutus* Liu, Slipiński, Wang et Pang, 2019 [Burmese amber]; *Protoliota*

antennatus Liu, Slipiński, Wang et Pang, 2019 [Burmese amber]; *Antiphloeus stramineus* Kirejtshuk et Nel, 2013 [Oise amber]; *Dendrobrontes popovi* Kirejtshuk, 2011 [Baltic amber]; *Mistranot* Alekseev et Bukejs, 2016 [Baltic amber]; *Cathartosilvanus necromanticus* Alekseev, 2017 [Baltic amber]; *C. siteiterralevis* Alekseev, Bukejs et McKellar, 2019 [Baltic amber]; *Airaphilus simulacrum* Alekseev, Bukejs et McKellar, 2019 [Baltic amber]; and “*Airaphilus*” *denticollis* Ermisch, 1942 [Baltic amber]. The fossil *Pleuroceratos burmiticus* Poinar et Kirejtshuk, 2008 originally placed in Silvanidae is removed from this family to Cucujoidea incertae sedis (according to Liu et al. 2019).

The extant genus *Cathartosilvanus* Grouvelle, 1912 includes five described extant species native to the New World (Halstead 1973, 1993; Thomas 1993; Thomas & Chaboo 2015): *C. imbellis* (LeConte, 1854), *C. opaculus* (LeConte, 1854) [= *C. trivialis* (Grouvelle, 1878)], *C. vulgaris* Grouvelle, 1878, *C. tropicalis* (Van Dyke, 1953), and *C. aitkenae* Halstead, 1993. Two extinct species of this genus have been recently described from Baltic amber (Alekseev 2017; Alekseev et al. 2019). In the present paper, we provide a description of a new species of *Cathartosilvanus* from Upper Eocene Rovno amber. It is the first report of Silvanidae from this *Lagerstätte*.

MATERIAL AND METHODS

The material examined is deposited in the collection of the Museum of Amber Inclusions, University of Gdańsk (Poland) [MAIG]. The amber pieces were polished by hand, allowing improved views of the included specimens, and was not subjected to any supplementary fixation.

Observations of this specimen were made using a Nikon SMZ 745T stereomicroscope. The photographs of specimens were taken using a Canon 70D camera with a macro lens (Canon MPE-65 mm). Extended depth of field at high magnifications was achieved by combining multiple images from a range of focal planes using Helicon Focus v. 6.0.18 software, and the resulting images were edited to create figures using Adobe Photoshop CS5.

The following references were used for the comparison with fossil and closely related recent taxa: Halstead (1973), Thomas (1993), Alekseev (2017), and Alekseev et al. (2019).

SYSTEMATIC PALAEOLOGY

Superfamily Cucujoidea Latreille, 1802
Family Silvanidae Kirby, 1837
Subfamily Silvaninae Kirby, 1837

Genus *Cathartosilvanus* Grouvelle, 1912

Note. The studied amber specimen shows the combination of characters unequivocally corresponding to the subfamily Silvaninae: subparallel body shape; pentamerous tarsi with tarsomere 4 smallest; closed procoxal cavities; 11-segmented antennae with distinct, loose antennal club; antennal scape comparatively short, about as long as wide; frons laterally without longitudinal sulcus; and frontoclypeal suture absent.

The beetle under consideration is assigned to *Cathartosilvanus* based on the combination of the following characters: (1) lateral sides of pronotum not dentate; (2) anterolateral denticle on pronotum present and located behind anterior margin of pronotum; (3) all tarsomeres simple (not lobed and not incrassate); (4) abdominal ventrite 1 with femoral lines open; (5) antennomere 8 not narrower than antennomere 7; (6) antennal club 3-segmented with first segment narrower than second; (7) antennomere 11 not obviously elongate; (8) antennomeres without spines; and (9) apical segment of labial palp not smaller than previous segment.

Cathartosilvanus perkovskyi sp. nov.

(Figs. 1–2)

Type material. Holotype: collection number 6784 [MAIG] (ex. coll. Jonas Damzen JDC 9454); adult, sex unknown. A complete beetle included in a transparent, yellow, elongate amber piece with dimensions of 44 mm × 12 mm and a maximum thickness of 5.5 mm; preserved without supplementary fixation. Syninclusions: fragments (legs) of unknown insect, and small detritus particle.

Type strata. Rovno amber, Upper Eocene.

Type locality. Rivne Oblast (region), Ukraine.

Etymology. The epithet of this new species is patronymic. The species is named in honor of our colleague Dr. Evgeny E. Perkovsky, leading researcher of insect inclusions in Rovno amber.



Fig. 1. *Cathartosilvanus perkovskyi* sp. nov., holotype, 6784 [MAIG], habitus: A – dorsal view; B – right lateral view

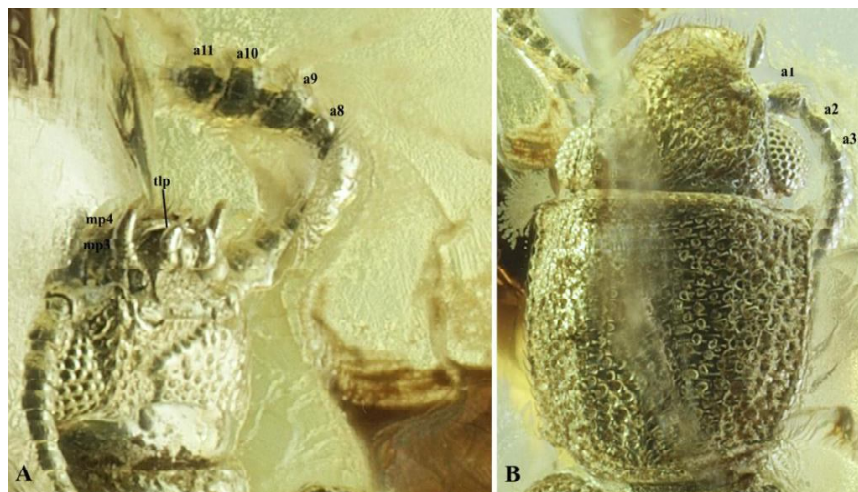


Fig. 2. *Cathartosilvanus perkovskyi* sp. nov., holotype, 6784 [MAIG]: A – details of head, ventrolateral view; B – details of head and pronotum, dorsal view. Abbreviations: a1-a11 – antennomeres 1-11; mp3-mp4 – maxillary palpomeres 3-4; tlp – terminal labial palpomere

Description. Measurements: body length 2.2 mm, maximum width 0.7 mm; head length 0.3 mm, head width (including eyes) 0.5 mm; pronotum length 0.6 mm, pronotum maximum width 0.6 mm; elytra length 1.3 mm, elytra maximum combined width 0.7 mm. Body elongate, almost parallel-sided, flattened; dorsum sparsely covered with fine, short, semi-erect setation, venter with less conspicuous very fine, recumbent setation; unicolorous dark brown (as preserved).

Head transverse, 1.7× as wide as long, slightly narrower than anterior pronotal margin; densely covered with round, rather large punctation, nearly as large as eye facet, distance between punctures 0.2–1.0× diameter of one puncture, punctures sparser and smaller in anterior portion of head; forehead almost flat, vertex slightly convex; frons without longitudinal sulcus laterally. Labrum with anterior margin widely rounded. Fronto-clypeal facets; widely separated, intraocular distance about 5.5× transverse diameter of one eye. Temples absent. suture absent. Compound eyes rather large, hemispherical, strongly prominent, with coarse Antennal grooves apparently absent. Maxillary palpi short, with 4 palpomeres; palpomeres 3–4 transverse, palpomere 4 conical, elongate, about 2× as long as wide, slightly narrower than palpomere 3. Terminal labial palpomere conical, nearly as wide as penultimate palpomere.

Antenna short, extending to middle of pronotum, stout, gradually thickening toward apex; 11-segmented, with indistinct, loose club apparently composed of 3 segments; covered with fine semi-erect setae; scape cylindrical, about as long as wide; pedicel subconical, elongate, about 1.7× as long as wide; antennomere 3 conical, elongate, slightly shorter and narrower than pedicel; antennomeres 4–6 cylindrical, elongate; antennomeres 7–8 transverse, subequal in shape and size; antennomere 9 transverse, 1.6× as wide as long, dilated apically, distinctly wider than antennomere 8, narrower than antennomere 10; antennomere 10 largest, strongly transverse, 1.8× as wide as long; antennomere 11 ovoid, nearly as long as wide, narrower than antennomere 10.

Pronotum as long as wide, widest in anterior one-third of its length, and slightly narrowed posteriorly; pronotal punctation round, dense and rather large, punctures larger than eye facet, distance between smaller than diameter of one puncture, punctures sparser medially and almost contiguous laterally; disc widely impressed in posterior portion. Anterior pronotal margin almost straight; posterior margin with a distinct rim; lateral sides almost parallel-sided in anterior two-thirds and slightly oblique in posterior one-third of their lengths, distinctly crenulate, with distinct anterolateral denticle. Anterior angles nearly rectangular, not produced anteriorly; posterior angles obtuse. Prothoracic hypomeron flat, with sparse, small punctation. Prosternum with large and dense punctation, distance between punctures 0.3–1.5× diameter of one puncture. Prosternal process elongate, dilated apically. Procoxal cavities closed.

Scutellar shield distinct, narrow, suboval, strongly transverse, about 2.5× as wide as long, densely covered with fine punctation.

Elytra elongate, 1.9× as long as wide combined, subparallel-sided, slightly wider than pronotum, widest nearly at middle, rounded separately. Elytral punctation dense and small in anterior two-thirds and fine in posterior one-third; arranged in distinct rows, each elytron apparently with nine rows; scutellary striole absent; intervals covered with micropunctation, convex in anterior one-third of elytral length. Humeral angles rounded. Epipleura well developed, reaching elytral apex, widest at humeri, covered with sparse, fine punctures. Metaventricle with flat disc and fine median line; densely covered with rather large punctation, distance between punctures equal to 0.5–1.5× diameter of one puncture, interspaces with micropunctation. Metepisterna long and narrow, with almost straight lateral margins, with longitudinal row of dense and large punctures.

Legs short and rather robust. Pro- and mesocoxa nearly round, metacoxa oval, transverse, not extending laterally to meet elytron; all coxae separated from each other: pro- and mesocoxae sepa-

rated by distance slightly smaller than one coxal diameter, metacoxae separated by about 0.3× transverse diameter of metacoxa. Trochanters small, apparently without spines. Femora clavate, slightly flattened, simple (without denticles or teeth), with deep, longitudinal groove apicoventrally. Tibiae shorter than femora, dilated apically, slightly curved; with minute apical spine. Tarsi pentamerous; all tarsomeres simple, not lobed; tarsomeres 1–3 subcylindrical, slightly dilated apically; tarsomeres 2 and 3 equal in size; tarsomere 4 very small; tarsomere 5 longest, about as long as tarsomeres 1–4 combined. Tarsal claws simple, widely diverged, equal in size, long, about 0.3× as long as apical tarsomere.

Abdomen with five visible, similarly and freely articulated ventrites; ventrite 1 with open femoral line (diverging posteriorly from margin of metacoxal cavities), intercoxal process triangular with acute apex; ventrite 5 rounded apically; densely covered with rather large punctation, distance between punctures equal to 0.5–2.0×

diameter of one puncture, interspaces with micropunctation. Relative lengths (medially) of ventrites 1–5 equal to 20:15:12:9:79.

Differential diagnosis. *Cathartosilvanus perkovskyi* sp. nov. can be distinguished by combination of characters: temples absent, pronotum not elongate, anterior angles of pronotum weakly developed, lateral sides of pronotum crenulate, and elytral intervals partially convex. Additionally, a new fossil species differs from similar in appearance (small body, pronotum as long as wide, and weakly developed anterior angles of pronotum) extant *C. opaculus* (LeConte, 1854) [distributed in Neotropic and southern Nearctic] in prosternal process without longitudinally rugose punctation and partially convex elytral intervals.

Cathartosilvanus perkovskyi sp. nov. from Rovno amber can be distinguished from the Baltic amber congeners by following key:

A key to species of *Cathartosilvanus* described from Eocene ambers

(1) Pronotum with sharp pronotal denticle at posterior angle, finely and sparsely punctate; temples present. Body length 2.3 mm. Baltic amber *C. siteiterralevis* Alekseev, Bukejs et McKellar
– Pronotum without pronotal denticle at posterior angle, deeply and densely punctate; temples absent..... 2

(2) Pronotal lateral sides crenulate; pronotum as long as wide; elytral intervals partially convex. Body length 2.2 mm. Rovno amber *C. perkovskyi* sp. nov.

– Pronotal lateral sides slightly uneven; pronotum slightly longer than wide; elytral intervals flat. Body length 3.5 mm. Baltic amber *C. necromanticus* Alekseev

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