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A new genus of Hallomeninae Gistel, 1848 (Coleoptera: Ttenebrionoidae: Tetatomidae) from Eocene Baltic amber

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A new species and genus of polypore fungus beetle, *Elasontagius dorbnickensis* gen. et sp. nov., is described and illustrated, representing the second formally described species of Tetratomidae from Eocene Baltic amber. This new extinct polypore fungus beetle belongs to the subfamily Hallomeninae and clearly differs from other representatives in absence of pronotal basal impressions and strongly transverse scutellum.

Key words: paleoentomology, polypore fungus beetles, fossil resin, Tertiary

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INTRODUCTION

According to Nikitsky (1998), thirteen extant genera within five subfamilies of Tetratomidae Billberg, 1820 are currently recognized: Tetratominae Billberg, 1820 (1 genus), Piseninae Miyatake, 1960 (3 genera), Penthinae Lacordaire, 1859 (2 genera), Hallomeninae Gistel, 1848 (2 genera), and Eustrophinae Gistel, 1848 (5 genera).

The fossil tetratomids are intensively studied in last decade and seven members of three subfamilies are known from different fossil resins at present: Cretaceous Taimyr amber (Nikitsky 1977), Eocene Baltic amber (Alekseev 2013), Cretaceous French amber (Soriano et al. 2014), and Cretaceous Burmese amber (Cai et al. 2016; Yu et al. 2016; Hsiao et al. 2018). The majority of known fossils of Cretaceous age belongs to the subfamily Eustrophinae (*Synchrotronia idinineteena* Soriano et Pollock, 2014; *Cretosynstrophus archaicus* Cai, Hsiao et Huang, 2016; *Thescelostrophus cretaceus* Yu, Hsiao, Ślipiński, Jin, Ren et Pang, 2016; *Allostrophus cretaceus* Hsiao, Ślipiński, Yu, Deng et Pang, 2018), one taxon represents *Hallomeninae (Pseudohallomenus cretaceus* Nikitsky, 1977 from Cretaceous Taimyr amber) and single fossil Tetratominae member, *Tetratoma (Abstrulia) nikitskyi* Alekseev, 2013, is known from Cenozoic Baltic amber. No fossils of Penthinae or Piseninae are known.

Hallomenus Panzer, 1794 currently placed within Tetratomidae (Nikitsky 1998; Young & Pollock 2002; Bouchard et al. 2011), but according to ear-

lier classification in Melandryidae Leach, 1815 (e.g. Kaszab 1969). Members of this genus are mentioned or listed in almost all old comprehensive catalogs of fossils (Bachofen-Echt 1949) and in monographic publications on inclusions in Baltic amber (Larsson 1978; Spahr 1981; Poinar 1992). In fact, the data on representatives of this genus in Baltic amber is originally based on specimens reported as "*Hallomenus* oder *Orchesia*" (Berendt 1845) and as "bei *Hallomenus*" (Klebs 1910). No additional documentation or more certain information is available since the early XX century and no descriptions or even additional reports have been published on *Hallomenus* in Baltic amber for over 100 years.

The absence of adequate description or illustrations of fossils makes controversial or even ambiguous the use of the inexact generic reports (Berendt 1845; Klebs 1910) in an analysis. The validation or negation of data on the existence of this genus in the Eocene is important for proper understanding of the evolution of polypore fungus beetles. In present study we don't solve the intriguing problem about occurrence of true *Hallomenus* in Eocene Europe but provide testable data on the Hallomeninae representative in Baltic amber describing the first fossil taxon of the subfamily from the Tertiary Lagerstätte.

MATERIAL AND METHODS

The amber piece containing the holotype is deposited in the Museum of Amber Inclusions (Muzeum Inkluzji w Bursztynie), Department of Invertebrate Zoology and Parasitology, Faculty of Biology, University of Gdańsk, Poland [MAIG].

The photographs of the specimen 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 sources were used for the systematic placement and comparison with extant and extinct taxa, and for morphological terminology: Nikitsky (1977, 1992, 1998), Toyoshima & Ishikawa (2000), Young & Pollock (2002), and Pollock (2015). Specimens collected by the first author in the Kaliningrad region (Russia), including both extant European representatives of Hallomenus [H. axillaris (Illiger, 1807) and H. binotatus (Quensel, 1790)] were also used for morphological comparison.

SYSTEMATIC PALAEONTOLOGY

Family Tetratomidae Billberg, 1820
Subfamily Hallomeninae Gistel, 1848

Genus *Elasontagius* gen. nov.

Type species. *Elasontagius dorbnickensis* sp. nov. by present designation

Differential diagnosis. The studied amber beetle shows the combination of characters unequivocally corresponding to Hallomeninae within Tetratomidae (Nikitsky 1998, Young & Pollock 2002): tarsal formula 5-5-4; prosternal process separating procoxae; all tarsomeres simple and narrow (non-lobed); antennomeres 3–11 not widened and not forming a club (i.e. antennae filiform); tibial spurs short and non-serrate; and apical maxillary palpomere oblong and slightly expanded. The subfamily Hallomeninae includes one fossil genus, *Pseudohallomenus* Nikitsky, 1977, as well two extant genera: *Hallomenus* Panzer, 1794 (with two subgenera *Hallomenus* s.str. and *Xeuxes* Champion, 1889) and *Mycetoma* Dejean, 1834.

Elasontagius gen. nov. can be distinguished from both extant genera of Hallomeninae by the following set (Nikitsky 1998) of characters: (1) pronotum without basal impressions (pronotum of *Mycetoma* bears 3–4 strong impressions; pronotum of *Hallomenus* with 2 strong basal impressions); (2) elytra with irregular homogenous punctation (elytra of *Mycetoma* with usually 10

rows of punctures); (3) trochantin of procoxae not well-visible (in contrast to well-visible in *Mycetoma*); (4) antennae filiform (moniliform in *Mycetoma* and serrate in the subgenus *Xeuxes* of *Hallomenus*); (5) strongly transverse scutellum, more than 3× as wide as long (1.5× as wide as long in *Hallomenus*). New fossil genus strongly resembles the Holarctic *Hallomenus* s. str., but does not fully correspond to diagnosis of this extant genus (full absence of pronotal impressions), and therefore is placed into a new genus within the subfamily.

The newly described genus, *Elasontagius* gen. nov., differs from the Cretaceous Pseudohallomenus in the shape of scutellum (apically almost semicircular in the new genus in contrast to rectangular in *Pseudohallomenus*) and in shape of metepisternum (triangular and narrowed towards apex in the new genus and parallel-sided in *Pseudohallomenus*).

Derivatio nominis. The new genus is named in honour of Elżbieta (Ela) Sontag, the curator of the collection in the Museum of Amber Inclusions (University of Gdańsk, Gdańsk, Poland). Gender masculine.

Species composition. One new extinct species.

Elasontagius dorbnickensis sp. nov.
(Figs. 1–3)

Type material. Holotype: collection number 6702 [MAIG] (ex. coll. Jonas Damzen JDC 8772), Holotype / Elasontagius dorbnickensis gen. et sp. nov. / Alekseev et Bukejs des. 2020" [red printed label]; adult, sex unknown. A complete beetle included in a transparent, yellow amber piece with approximate dimensions of 35 mm × 23 mm and a maximum thickness of 10 mm; preserved without supplementary fixation. The ventral left part of the specimen is densely obscured by milky foam. Syninclusions (organic): few small stellate trichomes.

Type stratum. Baltic amber from Eocene amber-bearing blue Earth layers, mostly Bartonian age is interpreted for the extinct central European resin-producing forests (Bukejs et al. 2019).

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

Description. Measurements: body length 3.6 mm, body maximum width 1.4 mm; pronotum length 0.6 mm, pronotum maximum width 1.4 mm; elytra length 2.9 mm, elytra maximum width 1.4 mm.

Body elongate, oval, slightly convex; total body length / maximum body width = 2.6; integument unicolorous brown (as preserved). Pubescence homogenous, strongly recumbent, fine and rather dense. Punctation irregular, fine and very dense.

Head slightly convex. Compound eyes large, entire, slightly convex, vertical, about 1.8× as height as long, with distinct facets, without interfacetal setation; interocular frontal distance about 1.5× vertical diameter of one eye. Frontoclypeal suture distinct, almost straight. Antennae filiform, 11-segmented, rather short, extending to basal 1/6 of elytra; scape elongate oval, about 3× as long as wide; pedicel as long as wide, smallest, 0.3× as long as scape; antennomeres 3–7 elongate, trapezoidal, slightly dilated apically; antennomeres 8–10 elongate oval, equal in length and shape, about 2× as long as wide; antennomere 11 spindle-shaped with pointed apex, about 3.2× as long as wide. Relative length ratios of antennomeres 1–11 equal to 15:5:6:7:7:7:8:10:10:10:16. Maxillary palps 4-segmented; palpomere 1 smallest (poorly visible in studied specimen), palpomeres 2–3 subequal in length and shape, elongate, about 1.8× as long as wide, triangular, with slightly oblique apex; palpomere 4 slightly dilated apically, obliquely truncate, about 1.2× as long as palpomere 3. Labial palps with small, narrowly elongate terminal palpomere.

Pronotum strongly transverse, 2.3× as wide as long, slightly convex dorsally, about 1.7× as wide

as head including eyes; widest in basal 1/4, distinctly narrowed anteriad; basal pits or impressions absent; posterior margin straight, lateral margins slightly convex and non-crenulate; anterior and posterior angles rounded. Prosternal process narrow, distinctly narrower than diameter of procoxa, longitudinally impressed. Procoxal cavities open posteriorly. Metepisternum long, reaching metacoxae, subtriangular, widest anteriorly, entire. Scutellum with widely rounded apex, strongly transverse, 3.3× as wide as long.

Elytra elongate oval, slightly convex, 2.1× as long as wide; about 4.8× as long as pronotum, and as wide as pronotum maximum width; lateral margins subparallel in anterior 2/3 than gradually narrowed posteriad; elytral apices separately rounded. Elytral punctation uniform, homogenous, dense, fine; elytral disc without longitudinal impressions, striae or distinct rows of punctures. Epipleura narrow, reaching posterior margin of abdominal ventrite 2.

Legs slender and rather long. Procoxae widely oval, about 1.3× as wide as long, narrowly separated by procoxal process. Protrochantin not clearly visible. Metacoxae oval, strongly transverse, contiguous. Femora spindle-shaped, flattened. Tibiae simple, straight, narrower than

Fig. 1. *Elasontagius dorbnickensis* gen. et sp. nov., holotype, JDC 8772 [MAIG], habitus: A – dorsal view; B – ventral view; C – right lateral view. Total body length = 3.6 mm.

femora; protibiae with fringe of stout, dark setae apically, without spines; meso- and metatibiae with two non-serrate spurs of equal length, spurs of metatibia about 0.3× as long as metatarsomere 1. Tarsi long, metatarsus about as long as metatibia; tarsal formula 5-5-4; tarsomeres of all legs cylindrical, simple (non-lobed). Relative length ratios of mesotarsomeres 1–4 equal to 7:6:4:8. Relative length ratios of metatarsomeres 1–4 equal to 17:11:6:9. Tarsal claws simple, long, equal in length, slightly swollen at base.

Abdomen with five visible ventrites; abdominal sutures entire, straight; ventrite 5 with slightly emarginate apical margin. Relative length ratios of abdominal ventrites 1–5 equal to 15-15-15-13-10 (measured medially).

Note. Mesocoxae not visible in the studied specimen. Very fine and not complete sutural stria appears to be visible in apical half of elytra only.

Differential diagnosis. As for the genus (vide supra).

Derivatio nominis. The species name "dorbnickensis" is toponymic and derived from the non-existent small East Prussian settlement Dorbnicken, on the ground of which the present-day amber mine "Primorskoe" is situated.

Note. The data on the presence of Hallomenus in European Eocene was not supported in present study. The newly described fossil strongly resembles this Holarctic genus, but the peculiar

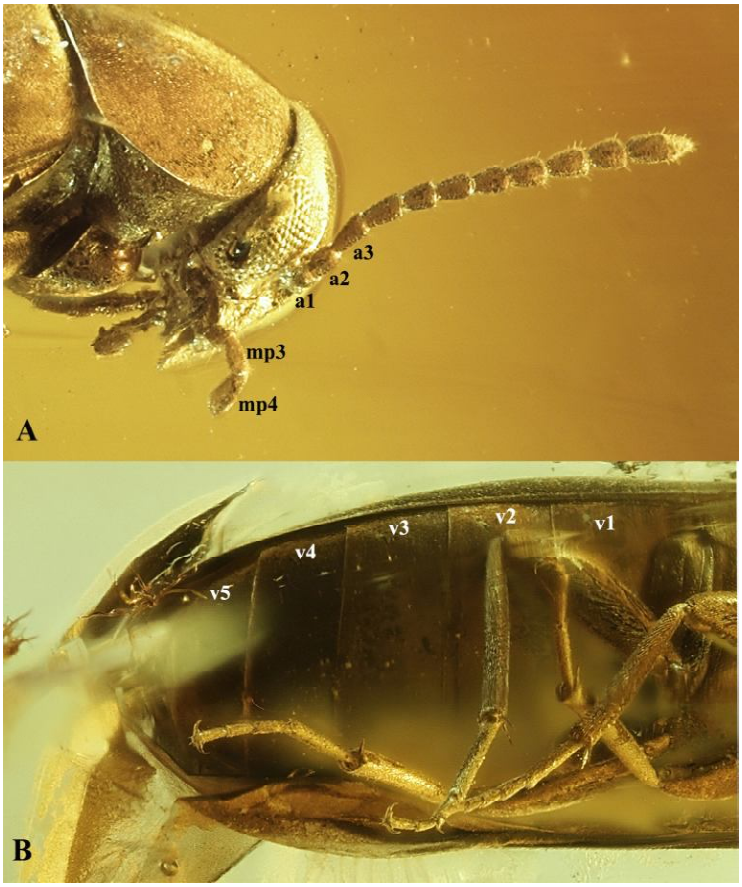

Fig. 2. *Elasontagius dorbnickensis* gen. et sp. nov., holotype, JDC 8772 [MAIG]: A – details of prothorax and head, lateral view; B – abdomen, middle and hind legs, ventral view. Not to scale. Abbreviations: a1-a3 – antennomeres 1-3; mp3-mp4 – maxillary palpomeres 3-4, v1-v5 – abdominal ventrites 1-5 respectively

morphological character of the pronotum hinders us to place it in that recent genus. The feeding association of this extinct Hallomenus-like beetle with any Polyporales and rotten wood is very possible, but we cannot discuss the habitat connection with more confidence because the taxon is considered morphologically different from extant relatives. Elasontagius dorbnickensis gen. et sp. nov. is the second described member of Tetratomidae from Eocene Baltic amber.

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