

Fifth contribution on silken fungus beetles from Late Eocene amber: a second Baltic amber species of *Atomaria* (Coleoptera: Clavicornia: Cryptophagidae)

Пятое сообщение о скрытноедах позднеэоценовых янтарей: второй вид рода *Atomaria* (Coleoptera: Clavicornia: Cryptophagidae) из балтийского янтаря

Е.Е. Perkovsky¹ & G.Yu. Lyubarsky²
Е.Э. Перковский¹, Г.Ю. Любарский²

¹ Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine, Bogdan Khmelnytsky str. 15, Kiev 01601, Ukraine.

² Zoological Museum of Moscow State University, Bol'shaya Nikitskaya str. 6, Moscow 103009, Russia.

¹ Зоологический институт им. И.И. Шмальгаузена НАН Украины, ул. Богдана Хмельницкого, 15, Киев 01601, Украина.

² Зоологический музей Московского государственного университета, ул. Большая Никитская, 6, Москва 103009, Россия.

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КЛЮЧЕВЫЕ СЛОВА. Cryptophagidae, *Atomaria*, поздний эоцен, балтийский янтарь, Россия

ABSTRACT. *Atomaria groehni* Lyubarsky et Perkovsky, **sp.n.** is described based on a fossil inclusion in Late Eocene Baltic amber. The new species differs from the extant *Atomaria* in side borders of pronotum, visible from above along the entire length; small size; long elevated pubescence. *A. groehni* **sp.n.** also differs from most species in short 3 joint of antenna. *A. groehni* **sp.n.** also differs from *A. gedanicola* Lyubarsky et Perkovsky, 2013 from Baltic amber in elevated pubescence, pronotum not narrowed towards base, broadest before the middle.

РЕЗЮМЕ. *Atomaria groehni* Lyubarsky et Perkovsky, **sp.n.** описана из инклюзий в позднеэоценовом балтийском янтаре. Новый вид отличается от рецентных *Atomaria* видимым по всей длине боковым кантом переднеспинки; малыми размерами; длинным приподнятым опушением. От большинства видов рода *A. groehni* **sp.n.** так же отличается коротким 3 члеником антенн. От описанного ранее из балтийского янтаря *A. gedanicola* Lyubarsky et Perkovsky, 2013 новый вид отличается приподнятым опушением и не суженной к основанию переднеспинкой, наибольшая ширина которой находится перед серединой её длины.

Introduction

The beetle family Cryptophagidae is classified within the Clavicornia of the superfamily Cucujoidea. The family is a group of small beetles with about 600 described species placed in approximately 51 genera and arranged in three subfamilies [Leschen, 1996; Johnson et al., 2007]. Cryptophagidae are represented in all major biogeog-

raphical regions, but species diversity is greatest in the tropical regions of Africa, Asia and the Americas.

Most members of the family are free-living and mycophagous, and other feeding strategies and food sources are also used (e.g., phytophagy, мухомокофагы) [Leschen, 1999, 2006]. Both adults and larvae of silken fungus beetles are commonly found on mold, fungi, under bark, as well as in decaying vegetation.

The family also comprises nidicolous beetles which live in burrows and nests of other animal species, and includes a number of species closely associated with social insects: bees, bumblebees, wasps, ants and termites [Crowson, 1981; Lyubarsky, 2002; Leschen, 1999, Haddad et al., 2008]. Cryptophagidae have also been discovered in nests of rodents and birds [Waage, 1979], as well as in lepidopteran larval nests [Branco et al., 2008]. Complex relationship of silken fungus beetles with animals of different taxa are not fully explored. In some cases (e.g., *Spavius* Motschulsky, 1844) the association is very strong, in other cases the interaction of silken fungus beetles with other insects is rather accidental.

Many cryptophagids are pyrophilic beetles, i. e. attracted by forest fires, arriving first to disturbed habitats [Muona & Rutanen, 1994; McCullough et al., 1998; Wikars & Schimmel, 2001; Billings et al., 2004; Wikars et al., 2004; Moretti et al., 2004; Parker et al., 2006]. Some genera have paired deep depressions at the ventral side of the pterothorax, which function as mycangia [Wikars & Elewi, 1997]. It is possible that fungi that persist in micangia then grow in new habitats to serve as food for these mycophagous beetles [Wheeler, Blackwell, 1984; Grebennikov & Leschen, 2010; Gullan & Cranston, 2010].



Figs 1–2. *Atomaria groehni* sp.n., habitus: 1 — lateral view of top-left; 2 — front view of top.
Рис. 1–2. *Atomaria groehni* sp.n., внешний вид: 1 — сбоку и сверху; 2 — сверху и спереди.

Discoveries of cryptophagids in fossil resins [see Lyubarsky & Perkovsky, 2010, 2011b, 2012a, 2013] are of particular interest; over time, generalizations based on such data can help to understand paleoclimates, especially if supplemented by the data on recently described Erotylidae and Phalacridae [Lyubarsky & Perkovsky, 2011a, 2012b], which are taxonomically related groups of Cucujoidea.

The tarsal formula 5–5–5, 11-segmented antenna, 3-segmented antennal club of the new species are characteristic of the family Cryptophagidae. The new species has antennal insertions under the lateral margin of the forehead; pronotum without callosity and teeth; pronotum without submarginal lines; ventrite 1 longer than the remaining ventrites; and confused elytral punctuation. These characters are indicative of the genus *Atomaria* Stephens, 1829.

Representatives of *Atomaria* (about 200 species) are found in all biogeographic realms [Leschen, 1996; Johnson, 2007]; 127 species are known to occur in the Palaearctic Region [Johnson et al., 2007]. The genus is rarely recorded in the Baltic amber, the first species was described just a year ago [Lyubarsky & Perkovsky, 2013].

Photographs were taken at the Paleontological Institute, Russian Academy of Sciences (Moscow) by A.P. Rasnitsyn using a Leica M 165 microscope and Leica DFC 425 camera. The captured images were assembled with Helicon Focus 5.01 software.

Holotype will be deposited in the collection of Geological-Palaeontological Institute of the University of Hamburg, Germany (GPIH).

Taxonomy

Family Cryptophagidae Kirby, 1837

Subfamily Atomariinae LeConte, 1861

Atomaria Stephens, 1829

Atomaria (*Anchicera*) *groehni*

Lyubarsky et Perkovsky, **sp.n.**

Figs 1–3

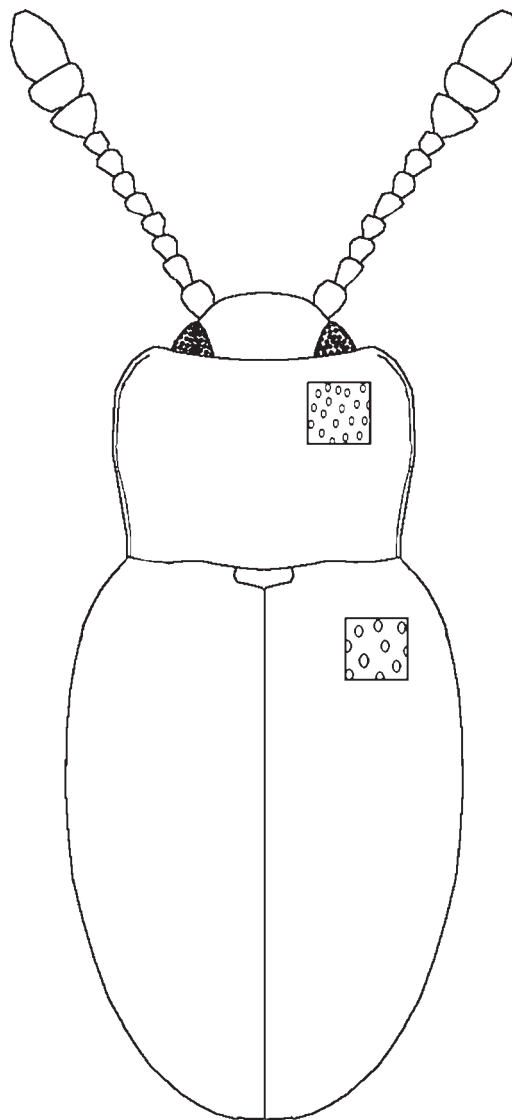
MATERIAL. Holotype, GPIH no. 4458, ex coll. Gröhn no. 4297, Yantamyi, Baltic amber, Late Eocene. Syninclusion: male of *Tapinoma* sp. (Formicidae). Sex of the holotype unknown.

DESCRIPTION. Length of body 1.0 mm.

Body broadly elongate, moderately arched, slightly convex; head, pronotum, and elytra light-brown. Elytra slightly convex, covered with slightly curved long elevated pubescence (Figs 1–3).

Head transverse, of normal size, with hemispherical faceted eyes, strongly punctured. Antennae long, slender, with club reaching beyond base of pronotum, joints of flagellum elongate, 3rd short, 4th and 6th segments as long as broad, 5th 1.5 times as long as broad, 9th slightly transverse, 10th transverse, 11th obliquely oval, joints 9–11 equal in width. Antennae inserted under the lateral margin of the forehead, widely separated basally, antennal insertions close to the eyes.

Pronotum convex, not narrowed basally, distinctly transverse, barely 1.5 times broader than long, broadest before the middle, moderately strongly and very densely punctured (distance between punctures equal to their diameter), a single



Figs 3. *Atomaria groehni* **sp.n.**, habitus.

Рис. 3. *Atomaria groehni* **sp.n.**, внешний вид.

puncture smaller than the diameter of the eye facet. Pubescence long and elevated. Sides finely margined, anterior edge weakly sinuate, without excision. Pronotum broadest before middle of its length. Side borders visible from above along the entire length. Lateral margin without callosity, posterior corners right angled, basal edge lobed, strongly sinuate, basal groove shallow.

Scutellum small, transverse. Elytra short-oval, moderately convex, humeral corners rounded, maximum breadth of elytra in first third of their length, 1.7 times as long as wide and 2.7 times as long as thorax, punctuation slightly stronger and sparser than that on pronotum. Punctures in the basal part slightly stronger than those on the pronotal disk, and approximately 1.5–2.0 diameters apart from their lateral neighbours on an average; elytral humeri not toothed.

REMARKS. *Atomaria groehni* **sp.n.** differs from the small species similar to *A. pusilla* (Paykull, 1798), *A. sodermani* Sjöberg, 1947, in side borders of pronotum visible from above along the entire length; long elevated pubes-

cence. The new species differs from similar species with lateral margin of pronotum visible from above, such as *Atomaria morio* Kolenati, 1846 and *A. versicolor* Erichson, 1846, by small size and long elevated pubescence. *Atomaria groehni* sp.n. differs from species similar to *A. testacea* Stephens, 1830 in pronotum slightly narrowed basally. A new species differs from most species by short 3rd joint of antenna; usually 3rd joint is longer than 4th, but in *A. groehni* sp.n. these joints are approximately equal in length.

The first species from Baltic amber, *A. gedanicola* Lyubarsky et Perkovsky, 2013, differs from *A. groehni* sp.n. in decumbent pubescence, pronotum narrowed towards base, broadest before middle of its length.

The new species is outwardly similar to *Atomaroides ussurica* Lyubarsky, 1987, but easily distinguished by structure of tarsi, which in *Atomaroides ussurica* are 4–4–4 and lobed.

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