

New findings of Cryptophagidae (Coleoptera: Clavicornia) from Baltic amber in the unbiased collection of the Paleontological Institute of RAS

Новые находки Cryptophagidae (Coleoptera: Clavicornia) из репрезентативной коллекции балтийского янтаря ПИН РАН

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КЛЮЧЕВЫЕ СЛОВА: Cryptophagidae, *Atomaria*, *Micrambe*, поздний эоцен, балтийский янтарь.

ABSTRACT. In the Paleontological Institute's collection the two new fossil specimens of Cryptophagidae were found in Late Eocene Baltic amber. One specimen belongs to the genus *Micrambe* Thomson, 1863. This specimen was identified as *Micrambe sarnensis* Lyubarsky et Perkovsky, 2010. Earlier this species was found in Rovno amber, but the new specimen is from Baltic amber. A redescription of *M. sarnensis* is presented in this paper. An important character of the species is a large callosity occupying a quarter to a third of the lateral edge of the pronotum, and ending in a thin spike at the apex. Another specimen belongs to the genus *Atomaria* Stephens, 1829. This specimen was identified as *A. groehni* Perkovsky et Lyubarsky, 2014 earlier described from Baltic amber. A redescription of the species *A. groehni* is presented.

РЕЗЮМЕ. В коллекции Палеонтологического института в балтийском янтаре позднего эоцена были обнаружены два ископаемых экземпляра Стуртофгаиде. Один экземпляр принадлежит к роду *Micrambe* Thomson, 1863 и был идентифицирован как *M. sarnensis* Lyubarsky et Perkovsky, 2010 ранее известного из ровенского янтаря. Важным признаком вида является крупная мозоль, занимающая от четверти до трети латерального края переднеспинки и заканчивающаяся тонким шипом на вершине. Другой экземпляр принадлежит к роду *Atomaria* Stephens, 1829. Этот экземпляр был идентифицирован как *A. groehni* Perkovsky et Lyubarsky, 2014,

ранее описанный из балтийского янтаря. Приведено переописание *M. sarnensis* и *A. groehni*.

Introduction

New fossil specimens belonging to the family of Cryptophagidae were found in the collection of the Paleontological Institute RAS (PIN), Russian Academy of Sciences.

The Cryptophagidae or silken fungus beetles are a family of beetles with about 1000 described species represented in all biogeographic realms. Both adults and larvae of silken fungus beetles are commonly found on mold, fungi, under bark of trees, as well as in decaying vegetation and in the nests of social Hymenoptera, birds and mammals. Most cryptophagids are nidicolous beetles; they are one of the most abundant beetles in the nests and burrows of rodents, birds and social insects [Lyubarsky, 1996, 2002].

The first Cretaceous cryptophagid species from fossil resins was the Atomariinae *Nganasania khetica* Zherikhin, 1977 from Santonian Taimyr amber [Zherikhin, 1977; Lyubarsky, Perkovsky, 2014]. Then several more species and genera were described. From the Early Cretaceous of southern China *Shixitomaria cretacea* (Cai et Wang, 2013) was described [Cai, Wang, 2013; Lyubarsky, Perkovsky, 2018], from Albian Spanish amber *Albocryptophagus cantabricus* Peris et al.,

2017 [Peris et al., 2017]. From Santonian Taimyr amber Cryptophagini *Microticus khatanga* Lyubarsky et Perkovsky, 2015 and *Ennoticus mnemosynon* Lyubarsky et Perkovsky, 2017 [Lyubarsky, Perkovsky, 2015, 2017a] as well as atomariine *Nganasania taymyrica* Lyubarsky et Perkovsky, 2014 [Lyubarsky, Perkovsky, 2014].

Most paleontological findings of Cryptophagidae are from Late Eocene and Miocene [Kirejtshuk, Ponomarenko, 2014]. In Late Eocene amber the representatives of the subfamily Cryptophaginae (*Antherophagus* Dejean, 1821, *Cryptophagus* Herbst, 1792, *Micrambe* Thomson, 1863, *Telmatophilus* Heer, 1841) and Atomariinae (*Atomaria* Stephens, 1829, *Ephistemus* Stephens, 1829) have been found. The last genus is also reported from the Bitterfeld amber [Hieke, Pietrzenuk, 1984]. These genera are reported from the Late Eocene Baltic amber found in former Eastern Prussia (now Kaliningrad region) [Klebs, 1910; Kubisz, 2001]. Latest Priabonian "*Telmatophilus*" *britannicus* Kirejtshuk et Kurochkin, 2019 [Kirejtshuk et al., 2019] from the Bembridge Marls of the UK has been transferred to Cryptophilinae (Erotylidae) as *Cryptophilus britannicus* (Kirejtshuk, Kurochkin, 2019). *Telmatophilus sidorchukae* Lyubarsky et Perkovsky was described from Priabonian Rovno amber, representing the first known Eocene species of the genus [Lyubarsky, Perkovsky, 2020]. A new genus, *Spaniophagus* was described from the Upper Eocene Baltic amber [Lyubarsky, Perkovsky, 2019]. The first Eocene species *Micrambe* from the Rovno amber was recently described as *M. sarnensis* by Lyubarsky et Perkovsky [Lyubarsky, Perkovsky, 2010].

So far only one species of the genus *Micrambe* Thomson, 1863 has been known from Rovno amber. Three species of *Atomaria* Stephens, 1829 have been described from Baltic and Rovno amber: *A. gedanicola* Lyubarsky et Perkovsky, 2013, *A. groehni* Perkovsky et Lyubarsky, 2014 and *A. saxonica* Lyubarsky et Perkovsky [Lyubarsky, Perkovsky, 2013, 2014, 2018]. In this work we re-describe two specimens of Cryptophagidae belonging to the genera *Atomaria* and *Micrambe*.

Photographs were taken at the Paleontological Institute, Russian Academy of Sciences by A.P. Rasnitsyn using Leica MZ 16 and by D. D. Vorontsov using the microscope Nikon Eclipse E800 with camera Olympus E-M10-II. Both specimens belong to unbiased PIN-964 collection [Dlussky, Rasnitsyn, 2009; Perkovsky, 2016].

Taxonomical part

Subfamily Cryptophaginae Kirby, 1826

Tribe Cryptophagini Kirby, 1826

Genus *Micrambe* Thomson, 1863

Micrambe sarnensis Lyubarsky et Perkovsky, 2010
Figs 1–4.

MATERIAL. PIN 964/1324, Baltic amber, Late Eocene. Sex: ♂.

A new specimen of the recently described species *Micrambe sarnensis* was found. This allows for a more accurate description of the species, taking into account the variability.

RE-DESCRIPTION. Body broadly elongate (Fig. 1), slightly convex; head, pronotum, and elytra reddish brown. Elytra slightly convex, covered with almost appressed pubescence.

Head transverse, of normal size, with prominent, hemispherical, somewhat coarsely faceted eyes (Fig. 4), strongly and sparsely punctured. Antennae 11-segmented, long, slender, with 3-segmented club, with club reaching beyond the base of pronotum, antennomeres 1–2 elongate, twice as long as wide, 3rd slender, elongate, twice as long as wide, joint 4th subquadrate, antennomeres 5–6 1.5 times as long as wide, joint 7th almost equal in length, antennomere 8 slightly transverse, 9th and 10th transverse, 10th 1.2 times as long as wide, 11th obliquely oval, antennomeres 9–11 equal in width.

Pronotum distinctly transverse, barely 1.8 times broader than long, moderately strongly and densely punctured (0.5–1 diameter apart), an individual puncture almost equal to facette diameter. Pronotum without sublateral line, somewhat convex, slightly rounded at sides, weakly crenulate. Sides finely margined, anterior edge weakly sinuate, posterior edge with broad median lobe, emarginated.

Anterior angles of pronotum with callosity, callosity occupying about one-third or one-fourth of side margin, with a small, elongate-oval patch of bare surface invisible from above; caudolateral corner acute angular, with tip. Lateral edge crenulated, with 7–9 small teeth. Posterior corners obtuse, base round, slightly sinuate, basal groove narrow.

Tarsal formula 5–5–4, claw simple, without tooth (Figs 2–3). Last of tarsal joints longest.

Scutellum small, transverse. Elytra oval, punctuation confused, humeral corners rounded, shoulders a little broader than maximum breadth of pronotum, 1.4–1.5 times as long as wide and 2.8–2.9 times as long as thorax, moderately convex, with moderately strongly rounded sides and a narrowly rounded apex, punctuation as strong as, yet more sparse than, that on pronotum. Epipleura reduced, present beyond level of posterior margin of 1st ventrite. Ventrite 1 longer than remaining ventrites.

Length 1.6–2.2 mm.

REMARKS. *Micrambe sarnensis* was described from Rovno amber and now found in Baltic amber. The new specimen belongs to this species. The *Micrambe* species are very variable, the most important characters (in addition to the structure of the genitalia) are the structure of the antennae, the structure of the callosity, the relative length and width of the pronotum, and size and number of teeth on the lateral edge. This specimen slightly differs from the holotype of *M. sarnensis*, and is within the range of variability that can be observed, for example, in the very widespread *M. abietis* (Payk., 1798), distributed throughout the Palaearctic.

The most noticeable differences between specimens: slight differences in the structure of antenna, antennomeres 1–2 elongate not transverse; callosity larger than in the holotype of *M. sarnensis*, occupying 1/3 of lateral edge. Size of body smaller, length of the holotype of *M. sarnensis* 2.2 mm.

Micrambe sarnensis is widespread in the late Eocene and in the Rovno and Baltic amber.

Subfamily Atomariinae LeConte, 1861

Tribe Atomariini LeConte, 1861

Genus *Atomaria* Stephens, 1829

Subgenus *Anchicera* Thomson, 1863

A. groehni Perkovsky et Lyubarsky, 2014
Figs 5–6.

MATERIAL. PIN 964/1325, Baltic amber, Late Eocene. Spec-

imen is deposited in the amber collection of the PIN RAS. Sex: unknown.

RE-DESCRIPTION. Length of body 1.0–1.1 mm, body elongate (Figs 5–6), moderately arched, head, pronotum, and elytra light-brown. Elytra slightly convex, covered with slightly curved long elevated pubescence.

Head transverse, of normal size, with hemispherical faceted eyes, strongly punctured. Antennae moderately long, with club reaching beyond base of pronotum, flagellomeres slightly elongate, antennomeres 1st, 2nd about 1.5 times as long as broad, 3rd slightly elongate, 4th and 6th antennomeres as long

as broad, 5th 1.5 times as long as broad, 7th, 8th subquadrate, 9th slightly transverse, 10th strongly transverse, 11th obliquely oval, antennomeres 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, slightly transverse, 1.2–1.5 times broader than long, broadest before the middle, moderately strongly and very densely punctured (distance between punctures equal to their diameter), a single puncture smaller than the diameter of the eye facet. Pubescence long and elevated. Sides finely margined, anterior edge

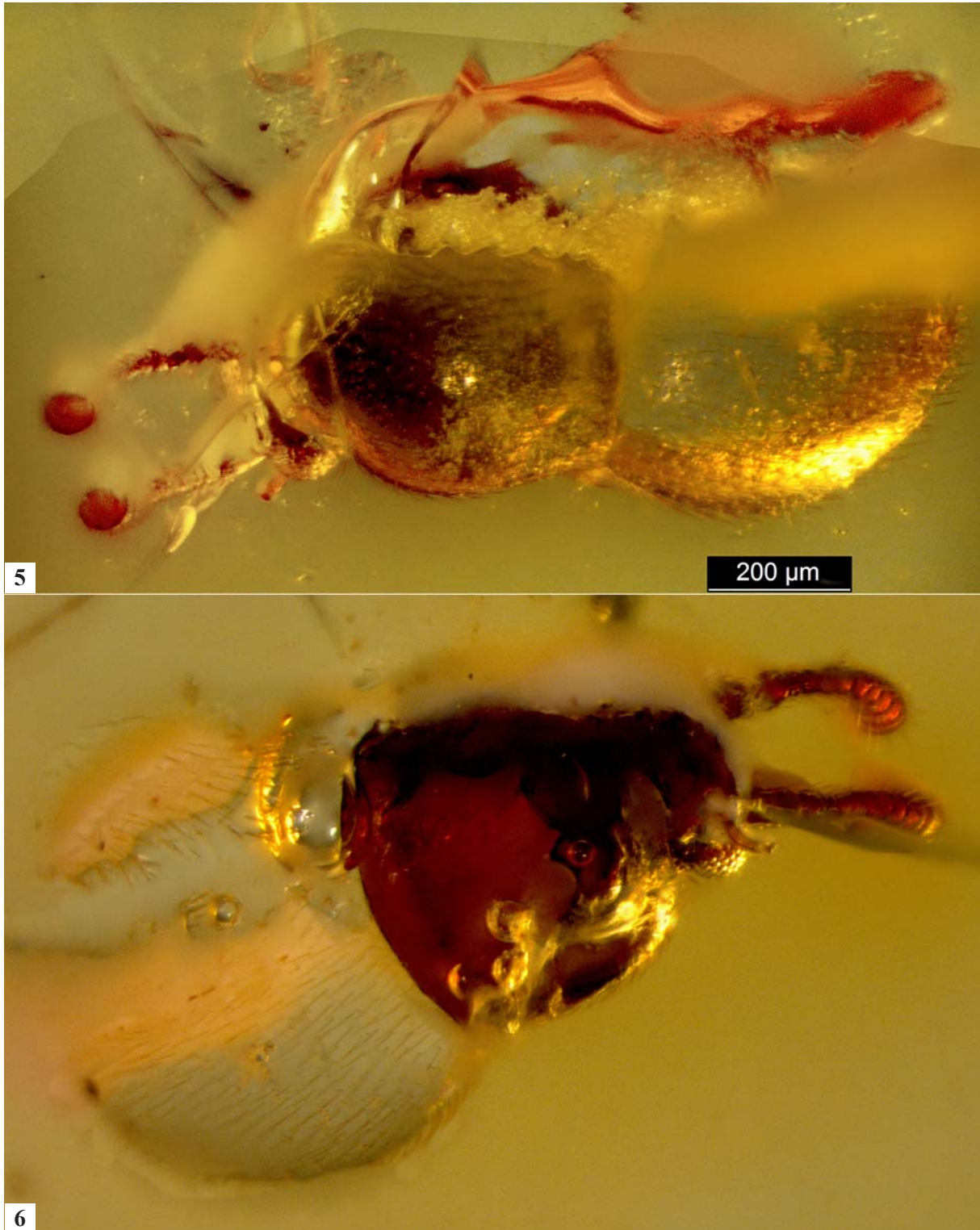


Figs 1–4. Photo of a new specimen of *M. sarnensis* from Baltic amber: 1 — dorsal view; 2 — lateral view; 3 — ventral view; 4 — head and pronotum, ventrolateral view.

Рис. 1–4. Внешний вид *M. sarnensis* из балтийского янтаря: 1 — габитус, сверху; 2 — габитус, сбоку; 3 — габитус, снизу; 4 — голова и переднеспинка, снизу и сбоку.

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, 1.6–1.7 times as long as wide and 2.5–2.7 times as long as thorax, punctuation slightly stronger and sparser than that on pronotum. Punctures in



Figs 5–6. Photo of a new specimen of *A. groehni* from Baltic amber: 5 — dorsal view; 6 — dorsolateral view.
Рис. 5–6. Внешний вид *A. groehni* из балтийского янтаря: 5 — сверху; 6 — сверху и сбоку.

the basal part slightly stronger than those on the pronotal disk, and approximately 1.5–2 diameters apart from their lateral neighbours on an average; humeri not toothed.

REMARKS. Representatives of *Atomaria* are found in all biogeographic realms including 127 species in the Palaeartic Region [Johnson et al., 2007].

Atomaria groehni differs from similar species with lateral margin of pronotum visible from above, such as *A. morio* Kolenati, 1846 and *A. versicolor* Erichson, 1846, by small size and long elevated pubescence. *A. groehni* differs from species similar to *A. testacea* Stephens, 1830 in pronotum slightly narrowed basally and small size. *A. groehni* differs from most species of the genus in the structure of the antenna: the segments of the flagellum are subquadrate or slightly elongate.

Among the species of amber, it differs in a combination of characters: pronotum broadest before the middle of its length; elytra covered by long elevated pubescence; side borders of pronotum visible from above along the entire length.

Discussion

In all Priabonian ambers the domination of Holarctic elements is strong [Perkovsky, 2017; Radchenko, Perkovsky, 2021], but in the Baltic amber it is most evident. Ambers from southern coast of Subparatethys differ in the better representation of thermophilic species (tropical element) [Perkovsky, Olmi, 2018; Colombo et al., 2020; Lyubarsky, Perkovsky, 2017b]. Better studied Hymenoptera from Rovno amber include less than 49% species known from Baltic amber [Simutnik et al., 2020; Colombo et al., 2021; Radchenko et al., 2021], Nematocera — 24% of such species [Gilka et al., 2021].

Among Rovno beetles only 13% are species known from Baltic amber [Kupryjanowicz et al., 2021; Legalov et al., 2021; Kirichenko-Babko et al., 2021; this paper]; as was supposed [Bukejs et al., 2020] many Baltic beetles would be found in Rovno amber, as is the case with Bitterfeld amber [Bukejs et al., 2016], however it is highly likely that some Holarctic taxa from Baltic amber were absent in Rovno fauna (and *A. groehni* could belong to this group). On the other hand, some beetles from Holarctic genera, described from Rovno amber, can be found in Baltic amber, as *Crepidodera* [Bukejs et al., 2016] and *Micrambe sarnensis*.

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Competing interests. The authors declare no competing interests.

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