

A newly discovered extinct species of Synchitini Erichson (Coleoptera: Zopheridae: Colydiinae) from Baltic amber

Новый ископаемый вид трибы Synchitini Erichson (Coleoptera: Zopheridae: Colydiinae) из балтийского янтаря

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Key words: Cenozoic, Paleogene, fossil resin, palaeontology.

Ключевые слова: кайнозой, палеоген, ископаемая смола, палеонтология.

Abstract. A new cylindrical bark beetle, *Synchita andrisbukejsi* sp.n., based on an inclusion in Baltic amber, is described and figured. This confirms the presence of a representative of this extant genus in the Western Palearctic during Paleogene. The occurrence of a representative of the Recent Xylariaceae-associated genus in Baltic amber indirectly indicates the presence of their host ascomycetes (Ascomycota: Sordariomycetes: Xylariales) in the Eocene amber forest. Examples of coleopteran inclusions useful for the precise reconstruction of the «Baltic amber forest» paleoecosystems (i.e. proxies for several taxa of plants and fungi) are also listed.

Резюме. Из включения в балтийском янтаре описан новый вид жуков-узкотелок, *Synchita andrisbukejsi* sp.n.; приводятся изображения экземпляра. Сообщение подтверждает присутствие представителя этого современного рода в палеогене западной Палеарктики. Находка в балтийском янтаре представителя рода, ныне связанного с грибами семейства Xylariaceae, опосредованно указывает на присутствие ксилариевых сумчатых грибов (Sordariomycetes: Xylariales) в эоценовом янтарном лесу. В дополнение приведены примеры инклюзов жуков в балтийском янтаре, важных для реконструкции палеоэкосистем «янтарного леса» (т.е. косвенных индикаторов некоторых таксонов растений и грибов).

Introduction

The widely spread genus *Synchita* Hellwig in Schneider, 1792 is one of the largest in the subfamily Colydiinae Billberg, 1820 and comprises more than 43 described species worldwide (Afrotropical, Australasian, Nearctic, Neotropical, Oriental and Palearctic regions), including 23 Palearctic species [Lee et al., 2020] and 10 currently recognized New World species [Ivie et al., 2016].

Fossil representatives of the Synchitini Erichson, 1845 from Baltic amber («*Cicones*» and «*Endophloeus*») were first cited at the generic level in the 19th century [Helm, 1896]. Five genera of the tribe have been reported from the Baltic amber by Klebs [1910]

without detailed species descriptions or illustrations: *Coxelus*, *Diodesma*, *Xylolaemus*, «bei *Endophloeus*», and *Synchita*. Representatives of several genera, *Diodesma* Latreille, 1829; *Xylolaemus* Reitter, 1882; *Endophloeus* Dejean, 1834; *Bitoma* Herbst, 1793; and *Semicoxelus* Alekseev et Pankowski, 2020, have been formally described from Baltic amber [Alekseev, Lord, 2014; Alekseev, 2015; Alekseev, Bukejs, 2016; Alekseev, Pankowski, 2020]. The genus *Cicones* Curtis, 1827 was synonymized with *Synchita* by Ślipiński and Lawrence [1997], but no more certain information on the taxon from amber is available since the early XX century for over 100 years.

A new cylindrical bark beetle was found by the current inventory of coleopteran inclusions from the collection of the Kaliningrad Regional Amber Museum, which contains 10190 amber pieces with different inclusions. In this paper, the beetle is documented as the first described extinct *Synchita* Hellwig species from Eocene Baltic amber.

Material and methods

The material examined (the holotype) is deposited in the collection of the Kaliningrad Regional Amber Museum (Russia) [prefix KAM]. The amber piece was polished manually with emery papers of different grit sizes, allowing improved views of the included specimen. The amber piece was not subjected to any supplementary fixation.

Measurements of the holotype were made using an ocular micrometer in a stereoscopic microscope MBS-9. The photographs of the specimen were taken using a Canon EOS 4000D camera mounted on a Zeiss microscope. 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 7.0.

The following references were used for the taxonomic placement and comparison with extant taxa: Reitter [1882], Schuh [1998], Ivie et al. [2016], Lord, Ivie [2016], and Lee et al. [2020].

The article is registered in ZooBank under the following link: <https://zoobank.org/References/B940ADD2-57EA-4B6B-8E38-E146CED63B7F>.

Results

Zopheridae Solier, 1834

Colydiinae Billberg, 1820

Synchitini Erichson, 1845

Synchita Hellwig in Schneider, 1792

Type species: *Synchita juglandis* Hellwig in Schneider, 1792

Notes. The studied amber specimen can be classified into the diverse tribe Synchitini within the subfamily Colydiinae based on the following characters: (1) dorsally concealed antennal insertions; (2) antennae glabrous, lacking scale-like setae, clubbed; (3) procoxal cavities open posteriorly; (4) all tarsi tetramorous, not dilated; (5) apex of protibiae without spurs; and (6) metacoxae narrowly separated.

The new extinct species belongs to the genus *Synchita* based on the presence of the above mentioned and the following characters: antennae 10-segmented; antennal club 1-segmented, with fine fusion line between the completely fused antennomere 10 and 11; subantennal grooves absent; antennomere 3 about as long as antennomere 4; eyes prominent and finely faceted; pronotal disc convex dorsoventrally, not carinate; pronotal lateral margins not denticulate; pronotum widest approximately at middle; elytral vestiture consists of arranged in rows bristle-like setae; scutellary striole absent. Thus the studied fossil beetle from Baltic amber is similar to representatives of *Synchita* from present-day fauna and can be considered as congeneric.

Synchita andrisbukejsi Alekseev, sp.n.

Figs 1–3.

<https://zoobank.org/References/C38500F1-0BF1-463A-97A3-C5A45C4DEE53> <https://zoobank.org/References/C38500F1-0BF1-463A-97A3-C5A45C4DEE53>.

Material. Holotype. No. 5726-64 [KAM]; «*Holotype / *Synchita andrisbukejsi* sp.n. / Alekseev des. 2022» [red handwritten label]; adult, sex unknown. A complete beetle with weakly deformed right elytral apex included in a 15 mm \times 9 mm \times 6 mm transparent, yellow amber piece preserved without supplementary fixation. The weight of the amber piece is about 0.5 g. The beetle is well preserved, but not perfectly visible in ventral position due to shape of the amber. Syninclusions: a few small stellate trichomes of Fagaceae.

Type stratum. Baltic amber from Eocene amber-bearing *Blaue Erde* deposits; estimated age: Middle–Late Eocene [Standke, 1998].

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

Description. Measurements. Total body length 1.93 mm; maximum body width (across maximum width of elytra combined) 0.79 mm; pronotal length 0.53 mm; pronotal width 0.71 mm; elytral length (along the elytral suture, including scutellum) 1.29 mm; antennal length 0.36 mm; head length 0.21 mm; head width between the internal margin of the eyes (interocular distance) = 0.36 mm.

Habitus. Small, elongate, subparallel (2.44 \times as long as wide); weakly convex dorsally and almost flat ventrally; uni-

coloured black. Dorsal surface granulose; vestiture consisting of narrow, long, semierect, dark bristles (straight at disc and apically curved at margins).

Head. Transverse (1.71 \times as wide as long), widest across eyes; with anterior portion slightly concave and frons flat; lateral margins convex above antennal insertions and narrowing to anterior margin; covered with moderately fine round granules; bearing lanceolate, suberect bristle-like seta. Anterior margin of clypeus rounded. Fronto-clypeal suture in the form of a weak transverse impression. Compound eyes relatively large and laterally prominent, convex, finely faceted, without interfacetal setation. Antennae short, extending to about middle of pronotum; 10-segmented with distinct 1-segmented club. Antennal insertions dorsally concealed. Scape and pedicel subcylindrical, nearly equal in length; antennomeres 3–9 subquadrate, subequal in size and shape; antennomere 10 the widest, widely ovate with rounded apex, almost as long as wide, bearing fine fusion line, with dense field of short fine pubescence at apex.

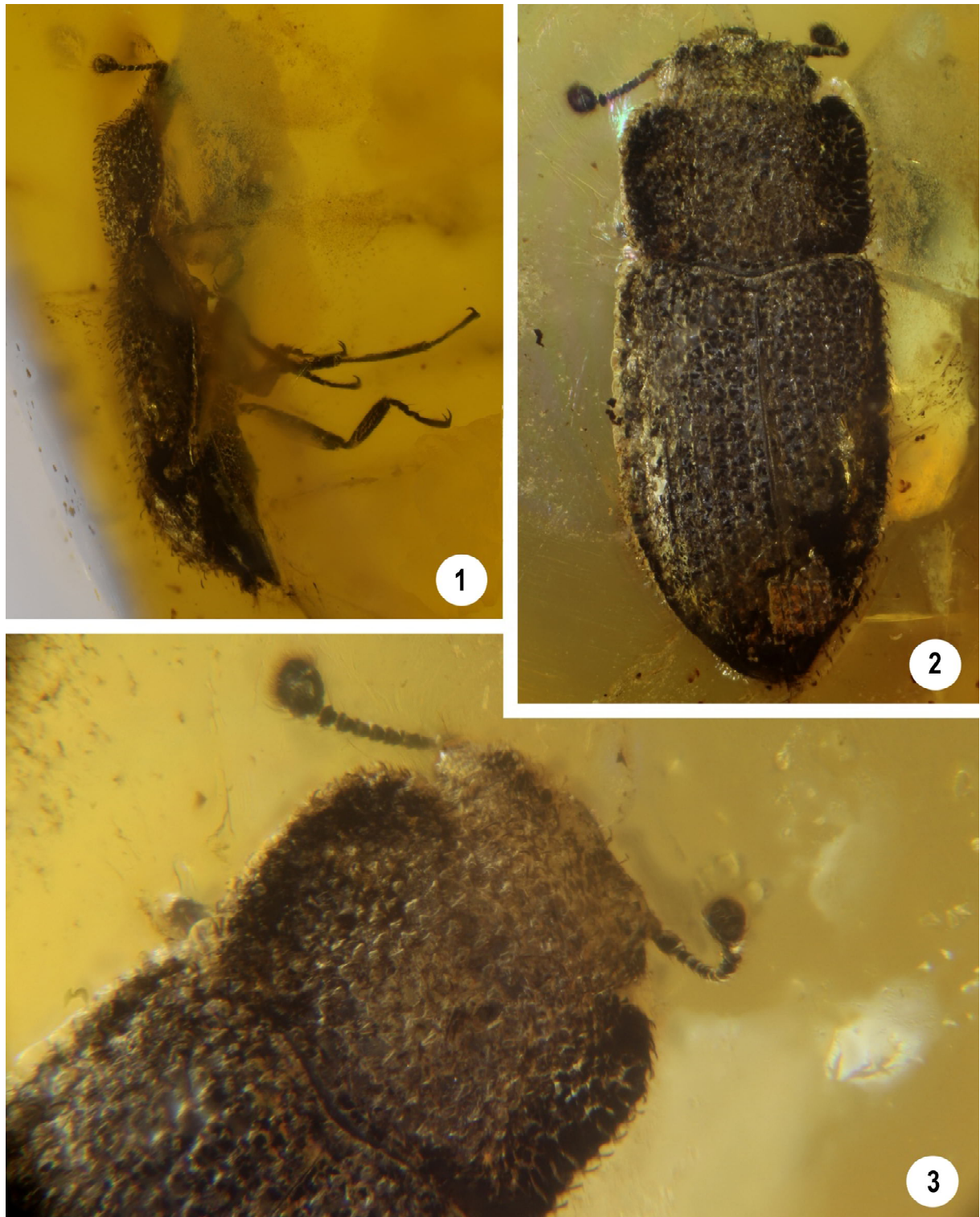
Thorax. Pronotum transverse (1.34 \times as wide as long), widest at the middle, narrower than elytral width at humeri; pronotal disc convex at the middle, lateral sides explanate; pronotal surface covered with granules (slightly larger than granules on frons) and relatively elongate and lanceolate bristle-like setae. Anterior margin sinuate; lateral margins almost parallel-sided, moderately explanate, with curved bristle-like setation; posterior margin weakly bisinuate, finely margined in basal median part. Anterior angles rounded, slightly prominent; posterior angles indistinct. Pronotal disc with two large lateral ear-form symmetrical impressions along lateral margins and one median very weak and shallow horseshoe-shaped impression. Prosternum densely covered with granules; procoxa nearly rounded; procoxal cavities open posteriorly separated by prosternal process. Scutellum small, oval, transverse, about 2.0 \times as wide as long.

Elytra almost parallel-sided in anterior two-thirds, tapered at apex, convex, about 1.63 \times as long as wide (combined), about 2.4 \times as long as pronotum. Humeral angles rounded. Elytra densely granulose, covered with elongate, bristle-like, semierect, dark setation, not forming any aggregations or concentrations. Part of elytral bristles arranged in longitudinal striae. Elytra striate-punctate. Punctures fine, rounded, weakly distinct between irregular granules and bristles and indistinct toward lateral and posterior margins. Scutellary striole absent. Epipleura present, well-developed, widest in basal half, slightly narrowing posteriorly, reaching abdominal ventrite 5. Hind wings are not apparent. Metaventricle with elongate median impression. Metacoxae transverse, elongate, narrowly separated by triangular abdominal intercoxal process.

Abdomen. With five visible ventrites, abdominal sutures distinct throughout length. Relative lengths of ventrites 12–8–6–5–11. Setation and punctation of ventrites not apparent (possibly absent); abdominal ventrite 5 with widely rounded posterior margin.

Legs. Short; femora slightly widened; tibiae straight; femora and tibiae subequal in length. Tarsal formula 4-4-4. Metatarsomere 4 the longest, as long as metatarsomeres 1–3 combined. Claws large (about as long as 0.3 \times tarsomere 4), simple.

Differential diagnosis. *Synchita andrisbukejsi* sp.n. differs from extant species of the genus in the following combination of characters: relatively small body size (1.93 mm); relatively short elytra (about 2.4 \times as long as pronotum); prominent convex eyes; well-developed pronotal relief (deep paired lateral impressions); entirely granulose dorsum; unicolorous black cuticle; uniform in length dorsal bristle-like setation, not forming any patches; subequal in size and form antennomeres 3–9.



Figs 1–3. *Synchita andrisbukejsi* sp.n., holotype, No. 5726–64 (КАМ), external appearance. 1 — lateral view; 2 — dorsal view; 3 — forebody, dorsal view.

Рис. 1–3. *Synchita andrisbukejsi* sp.n., голотип, No. 5726–64 [КМЯ], внешний вид. 1 — латерально; 2 — дорзально; 3 — передняя часть тела, дорзально.

The new species can be readily distinguished from all other described Baltic amber Sychitini in the 10-segmented antennae with 1-segmented antennal club.

Etymology. Patronymic, the specific name honors my colleague, co-author of many papers and leading European researcher of Coleoptera inclusions in Baltic amber, Dr. Andris Bukejs (Daugavpils, Latvia), who described more than hundred species of various beetles from Eocene ambers in last decade.

Discussion

Fossil beetles belonging to Recent genera can be used as possible indicators of several components of palaeo-environment, if bionomy and trophic relations of these genera are known, specified and considered stable over the time [Alekseev, Alekseev, 2016]. Similarly to various climate indicators in the study of the past, the mono- and oligophagous beetles can be «proxies» (or indirect indicators) of possible presence for their host plants or fungi in ancient ecosystems, that are still not directly reported from the deposit [Legalov, 2021]. Five examples of beetles used as a proxy for the Eocene plants and fungi not directly known in Baltic amber inclusions, are listed below:

1. Curculionidae: *Ceutorhynchus* Germar, 1823 [e.g. Legalov, 2013] — proxy for Brassicaceae (Magnoliopsida: Brassicales);
2. Belidae: *Oxycraspedus* Kuschel, 1955 [Legalov, 2016] — proxy for Araucariaceae (Pinopsida: Pinales);
3. Erotylidae: *Cycadophila* Xu, Tang, Skelley, 2015 [Alekseev, Bukejs, 2017] — proxy for Cycadales (Cycadopsida);
4. Rhynchitidae: *Pseudomesauletes* Legalov, 2001 [Bukejs, Legalov, 2021] — proxy for *Rosa* and *Rubus* (Magnoliopsida: Rosales: Rosaceae);
5. Melandryidae: *Wanachia* Schulze, 1912 [Alekseev, Bukejs, 2022] — proxy for *Trichaptum* (Basidiomycota: Agaricomycetes: Hymenochaetales).

The newly described species could be sixth example of possible indicator for biota still unknown from Baltic amber inclusions. Extant representatives of the genus *Synchita* Hellwig mostly lead subcortical lifestyle. The beetles are xylomycetophagous and feed on hyphomycete conidia or stromal tissue of various ascomycetes such as *Hypoxylon* *Diatrypella*, *Daldinia*, *Biscogniauxia* [= *Nummularia*], *Kretzschmaria*, *Cryptostroma*, *Jackrogersella*, *Eutypa* [Lawrence, 1977; Nikitsky et al., 1996; Heijerman et al., 2018; Lee et al., 2020; Esser, 2021], i.e. *Synchita* of recent is trophic associated with ascomycetes of the order Xylariales, first at all with the family Xylariaceae. Xylariaceous fungi are primarily parasites and saprophytes of various deciduous trees and occur on branches, standing tree trunks or logs. Representatives of Xylariaceae could be also suggested the most probable host for the described fossil beetle *Synchita andrisbukejsi* sp.n. in the Eocene mixed forest ecosystems. Records of Xylariaceae in Baltic amber or in the European Eocene

are unknown [Halbwachs, 2019], but it can be expected based on the presence of the genus *Synchita*.

Acknowledgements

I am sincerely grateful to Mrs. Anna V. Smirnova (KAM, Kaliningrad), the curator of the amber inclusion collection, for the possibility to study interesting inclusions under her care and also to Dr. Andranik R. Manukian (KAM, Kaliningrad) for the assistance and advises by photography process. I thank two anonymous reviewers for valuable suggestions and efforts to improve the manuscript.

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Поступила в редакцию 13.2.2022