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Two new species of the genus *Taphiopor* Moseyko & Kirejtshuk (Chrysomelidae: Eumolpinae) from Baltic amber

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Abstract

Two new species of *Taphiopor* Moseyko & Kirejtshuk are described and illustrated from Baltic amber: *T. rufous* sp. nov. and *T. carsteni* sp. nov. Members of this fossil genus are known from Baltic and Rovno amber. A key to species of *Taphiopor* is provided.

Key words: Euryopini, *Taphiopor*, new taxa, Tertiary, Eocene, fossil resin, key

Introduction

Baltic amber is found mainly along the southern coast of the Baltic Sea, where this material is usually associated with Late Eocene strata. Although most estimates of the age of Baltic amber have suggested derivation from the early Middle Eocene (Lutetian) (48.6–40.4 Ma) based largely on K-Ar dating (Ritzkowski 1997), palynological biostratigraphy of the specific region where the sample originated suggests a younger, Priabonian age (37.2–33.9 Ma) (Aleksandrova & Zaporozhets 2008). A detailed discussion of the stratigraphic basis for the age of Baltic amber deposits can be found in Perkovsky *et al.* (2007). According to Turkin (1997), Baltic amber was produced by *Pinus succinifera* (Conw.) Schub., which, together with the fagacean *Formanodendron*-like trees (Alexeev & Alexeev 2014), dominated the humid mixed forests of northern and Central Europe in the Eocene. More recent work on the chemical composition of Baltic amber has suggested that trees belonging to the families Araucariaceae or Sciadopityaceae might also have been candidates for the production of this amber deposit (Langenheim 2003; Wolfe *et al.* 2009; Lambert *et al.* 2014).

Despite their relatively common occurrence in the deposit, information on Chrysomelidae from Baltic amber is relatively scant. To date, 18 species have been described from this fossil resin (Germar 1813; Giebel 1856; Schaufuss 1891; Quiel 1909; Uhmman 1939; Bukejs & Konstantinov 2013; Bukejs & Nadein 2013, 2014, 2015; Moseyko & Kirejtshuk 2013; Biondi 2014; Bukejs 2014; Bukejs & Bezděk 2014; Bukejs & Chamorro 2015). Some records from Baltic amber contain only a generic or higher taxa attribution without detailed species descriptions (Hope 1836; Berendt 1845; Menge 1856; Helm 1896; Handlirsch 1907; Klebs 1910; Bachofen-Echt 1949; Larsson 1978; Spahr 1981; Hieke & Pietrzeniuk 1984; Kubisz 2000; Weitschat & Wichard 2002; etc.).

The monotypic genus *Taphiopor* Moseyko & Kirejtshuk, 2013 was established for one species found in Baltic amber, *T. balticus* Moseyko & Kirejtshuk, 2013. Another specimen of this genus from Late Eocene Rovno amber (Klesov, Ukraine) has been discovered in the Schmalhausen Institute of Zoology of the National Academy of Sciences of Ukraine, Kyiv. This specimen belongs to a separate species and awaits description. In the present paper, two new species belonging to *Taphiopor* are described and illustrated from Late Eocene Baltic amber.

Material and methods

The amber pieces were polished by hand and faceted on their sides, allowing improved views of the included specimens. The material examined is deposited in the collection of the Geological-Palaeontological Institute of the University of Hamburg, Germany [GPIH], as part of the collection of Carsten Gröhn.

Observations were made using a Nikon SMZ 745T stereomicroscope, while photographs were taken using a Nikon SMZ 745T stereomicroscope equipped with a Nikon DS-Fi1 digital camera. Merging of multiple focal planes to produce the final images with enhanced depth of field was performed with CombineZM software.

Systematic Palaeontology

Family Chysomelidae Latreille, 1802

Subfamily Eumolpinae Hope, 1840

Tribe Euryopini Lefèvre, 1885

Taphiopor Moseyko & Kirejtshuk, 2013

Type species: *Taphiopor balticus* Moseyko & Kirejtshuk, 2013

The specimens considered here were assigned to the genus *Taphiopor* based on the following character states: (1) tibiae without preapical emargination; (2) “propleura” (anterolateral parts of prosternum) convex; (3) elytra bare, each elytron with 12 regular rows of punctures; (4) head with paraocular grooves; (5) claws appendiculate.

Taphiopor rufous sp. nov.

(Figs 1–6)

Type. Holotype: Nr. “C 8002”, “Holotype / *Taphiopor rufous* sp. nov. / des. Bukejs A. & Moseyko A.G.” [red printed label]; sex unknown. The rather complete beetle missing left meso- and metatarsi is included in a small, transparent, polished subquadratic amber piece (length about 31 mm, width 27 mm, and maximum thickness 9 mm), that is yellowish in color, and prepared without supplementary fixation. Mouthparts and left side of specimen are partly obscured by a “milky” opacity. There are also one Oribatida (Acari), one stellate fagacean trichome, and a few small gas vesicles trapped within the examined amber piece.

Type strata. Baltic amber, Late Eocene, Prussian Formation (Priabonian). Estimated age: 37.2–33.9 Ma.

Type locality. Yantarny settlement [formerly Palmnicken], on the Sambian [Samland] peninsula, in the Kaliningrad region, Russia.

Etymology. Specific epithet is from the Latin “rufous” and refers to the reddish-brown body coloration of the new species.

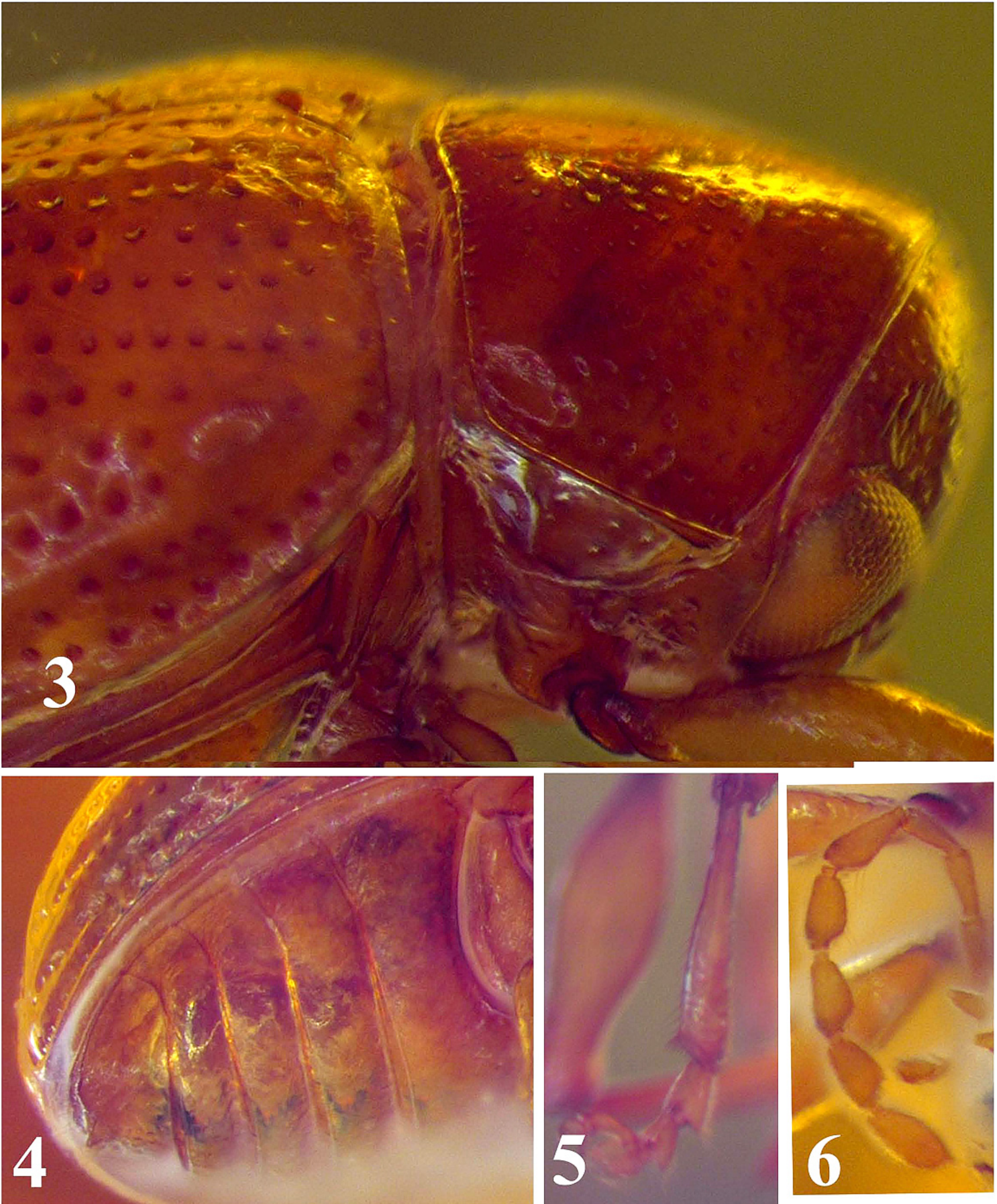
Differential diagnosis. *Taphiopor rufous* sp. nov. differs from *T. balticus* in having larger and denser pronotal punctation, head with fine punctures, and paler coloration of body. *T. rufous* sp. nov. differs from *T. carsteni* sp. nov. in shape of convex part of “propleura”, almost straight lateral margins of pronotum in posterior half, finer and sparser punctation of abdomen, and pale brown body.

Description. Body length 3.25 mm; body shape elongate oval in dorsal outline, moderately convex dorsally and ventrally; pale brown with head, pronotum, and elytral punctures rufous, and trochanters reddish brown; glabrous (except abdomen and legs).

Head hypognathous, frons and vertex with fine and sparse punctures. Compound eyes medium-sized, moderately convex, slightly emarginate at antennal insertions. Paraocular grooves present. Antennae filiform, long, extending nearly to middle of elytra; antennomeres 1–3 not visible because of “milky” opacity; antennomeres 4–6 subcylindrical, subequal in size, about 2.8 times as long as wide; antennomere 7 distinctly dilated apically, 2.5 times as long as wide, and about 1.1 times as long as antennomere 8; antennomeres 8–10 dilated apically, equal in



FIGURES 1–2. *Taphioporus rufous* sp. nov., Holotype, C 8002: 1—habitus, lateral view; 2—habitus, ventro-lateral view.



FIGURES 3–6. *Taphioporus rufous* sp. nov., Holotype, C 8002: 3—details of forebody, lateral view; 4—abdomen; 5—right mesotibia and tarsus; 6—apical part of left antenna.

shape and size, each about 2.3 times as long as wide; antennomere 11 elongated oval with pointed apex, about 1.1 times as long as antennomere 10.

Pronotum transverse; with small (nearly as large as diameter of one compound eye facet) and dense punctures, distance between punctures equal to 1–3 times diameter of one puncture, punctation distinctly sparser posteriorly. Posterior margin sinuate, with distinct bordering carina; lateral margins almost straight (in lateral view), with

narrow bordering carinae; anterior margin arcuate, with narrow bordering carina. Posterior angles widely rounded; anterior angles nearly rectangular. Anterolateral sides of prosternum ("propleura") convex with anterior margin straight medially; prosternum with well-pronounced antennal grooves; covered with fine, sparse punctures. Prohypomera with few fine punctures, shiny. Procoxae nearly round, shagreened; procoxal cavities closed posteriorly.

Scutellum moderately large, subtriangular with widely rounded apex, flat, impunctate. Elytra 2.4 times as long as pronotum, with bases wider than pronotal posterior margin; humeral calli well-developed, distinctly projecting. Elytral punctures round, small (slightly larger than pronotal punctures), dense, arranged in regular striae; distance between striae equal to 1–2 times diameter of one puncture. Each elytron with 12 striae, stria 1 shortened (extending only within basal one-quarter of elytral length), striae 1–6 and 12 reaching base of elytra, striae 11 and 12 fused in middle, striae distinct throughout entire length of elytron; distance between striae approximately 2–3 times diameter of single puncture; intervals flat (slightly convex in apical one-fifth of length), and smooth. Pygidium not exposed.

Epipleura without punctures, widest in basal half, gradually narrowing posteriorly, reaching elytral apex. Metepisternum about 4 times as long as wide, slightly dilated anteriorly; with row of fine punctures near exterior lateral margin (distinctly visible in posterior half); anterior margin oblique, lateral margins slightly emarginate. Metaventrite slightly convex, almost smooth (only with row of small punctures at lateral and anterior margins). Metepisternum and metaventrite with well developed border along lateral margins. Coxae with strong microreticulation; mesocoxae oval; metacoxae elongated oval, with transverse carina medially, distance between meso- and metacoxae nearly equal to 0.7 times transverse diameter of metacoxa.

Abdomen with five ventrites, slightly convex; covered with very fine and sparse indistinct punctures, and with fine, recumbent pale setae. Ventrite 1 the longest, twice as long as ventrite 2; abdominal intercoxal process rectangular, with rounded anterior angles. Ventrites 2–4 subequal in length. Relative length ratios of ventrites 1–5 (medially): 14-7-5-5-7. Ventrite 5 with widely rounded posterior margin and with shallow emargination apically.

Legs relatively long and slender, with fine, indistinct pubescence. Femora spindle-shaped, distinctly widened near mid-length; without teeth ventrally. Tibiae without preapical emargination, slightly widened apically, with setae at apices. Tarsomere 2 slightly bilobed, tarsomere 3 deeply bilobed. Metafemora 3.4 times as long as wide; metatibiae 5.1 times as long as wide. Metafemur 1.4 times as long as metatibia; metatarsus 0.7 times as long as metatibia. Relative length ratios of metatarsomeres 1–4: 11-9-7-12. Claws appendiculate, long.

***Taphioporos carsteni* sp. nov.**

(Figs 7–17)

Types. Holotype: Nr. "C 923", "Holotype / *Taphioporos carsteni* sp. nov. / des. Bukejs A. & Moseyko A.G." [red printed label]; sex unknown. The complete beetle with partly exposed hind wings is included in a small, rather transparent, polished subquadratic amber piece (length 21 mm, width 18 mm, and maximum thickness 7 mm), that is yellowish–orange in color, and preserved without supplementary fixation. There are also a few stellate fagacean trichomes, and small gas vesicles in the examined amber piece.

Paratype: Nr. "C 1183" "Paratype / *Taphioporos carsteni* sp. nov. / des. Bukejs A. & Moseyko A.G." [red printed label]; sex unknown. The complete beetle is included in a small, rather transparent, polished subrectangular amber piece (length 18 mm, width 12 mm, and maximum thickness 5 mm), with yellowish color, and without supplementary fixation. Ventral part of thorax and head are partly obscured by a "milky" opacity. There are also four stellate fagacean trichomes, a few small gas vesicles, and a few small pieces of organic material in the examined amber piece.

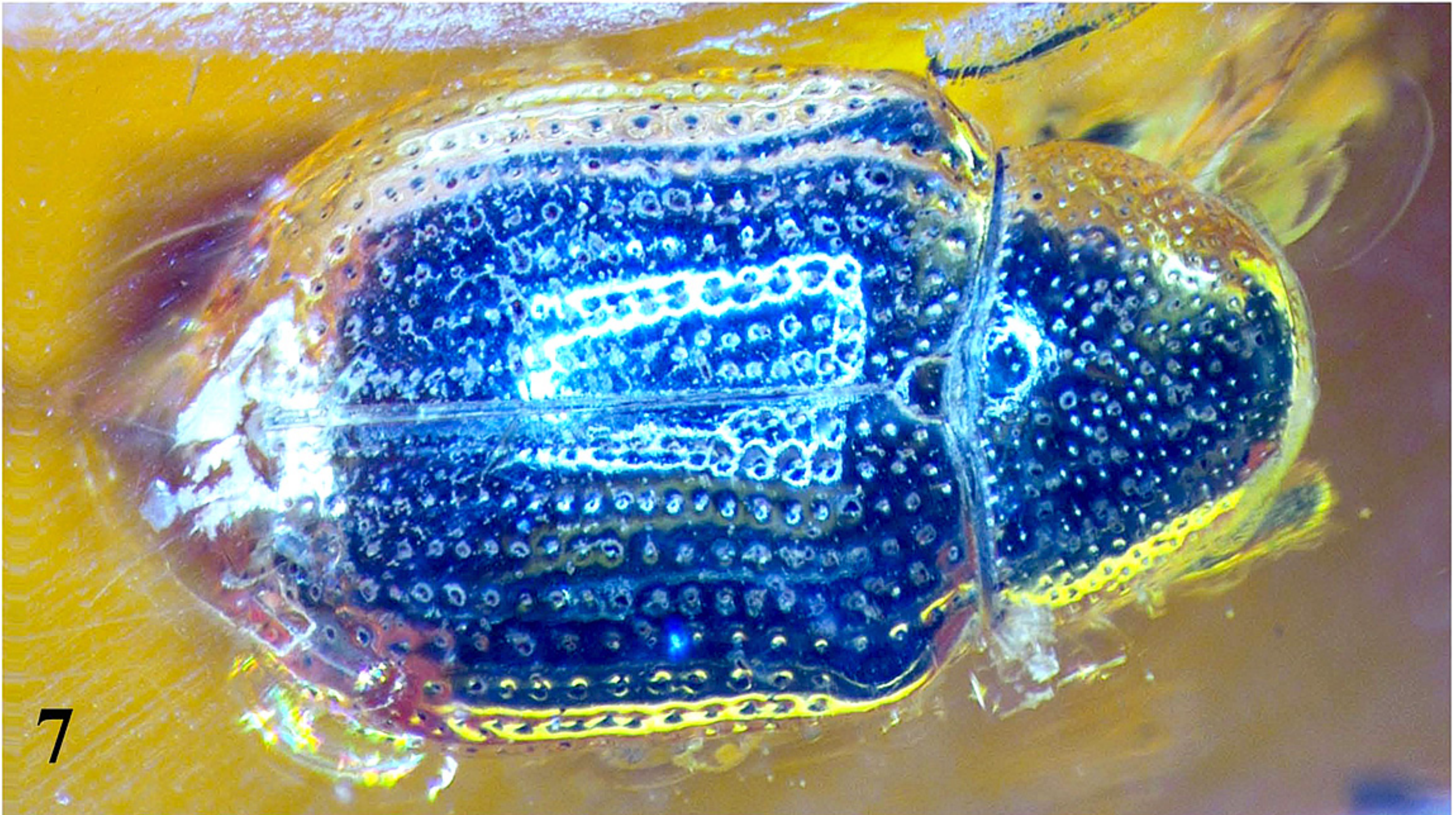
Type strata. Baltic amber, Late Eocene, Prussian Formation (Priabonian). Estimated age: 37.2–33.9 Ma.

Type locality. Yantarny settlement [formerly Palmnicken], of the Sambian [Samland] peninsula, within the Kaliningrad region, Russia.

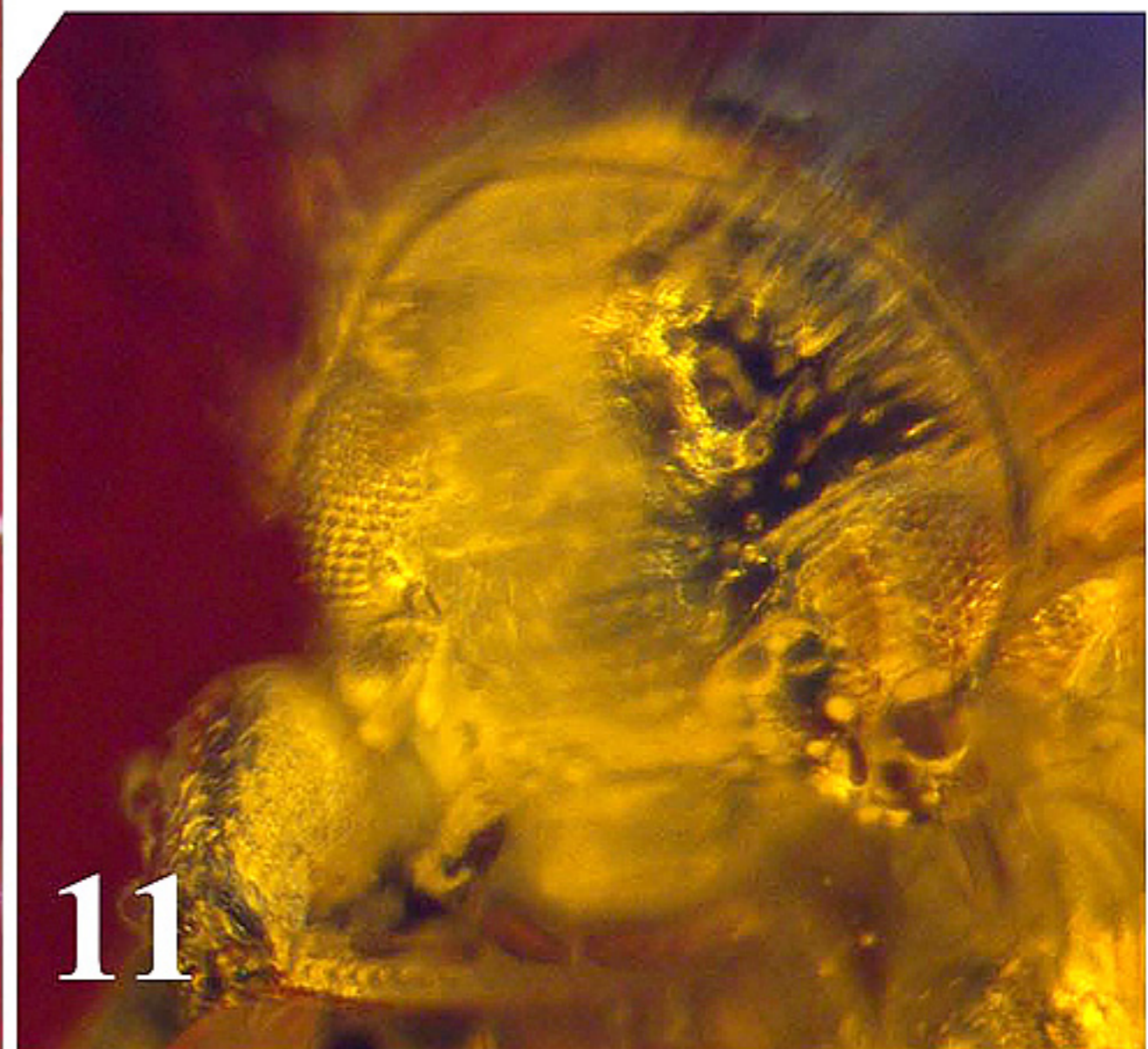
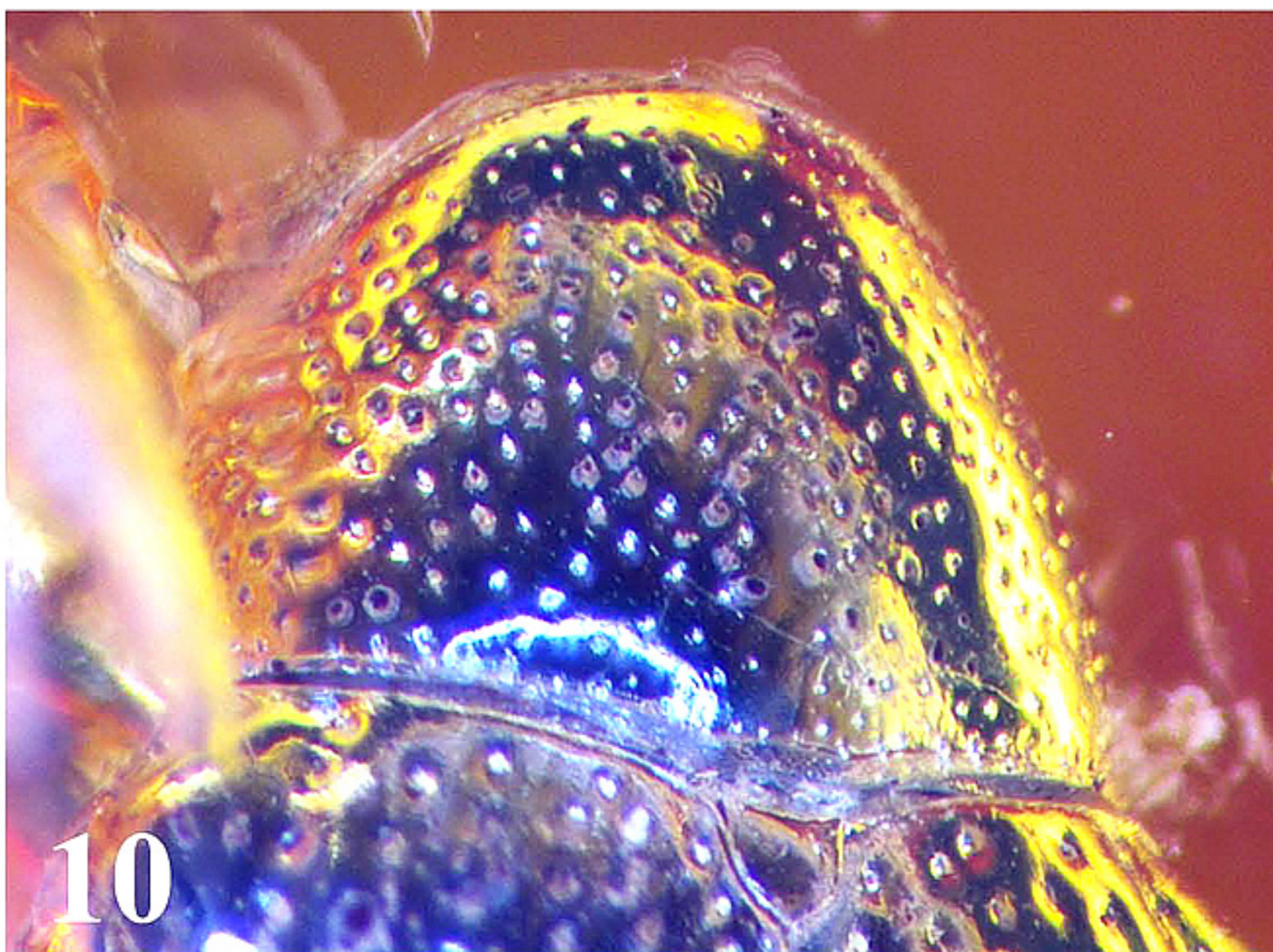
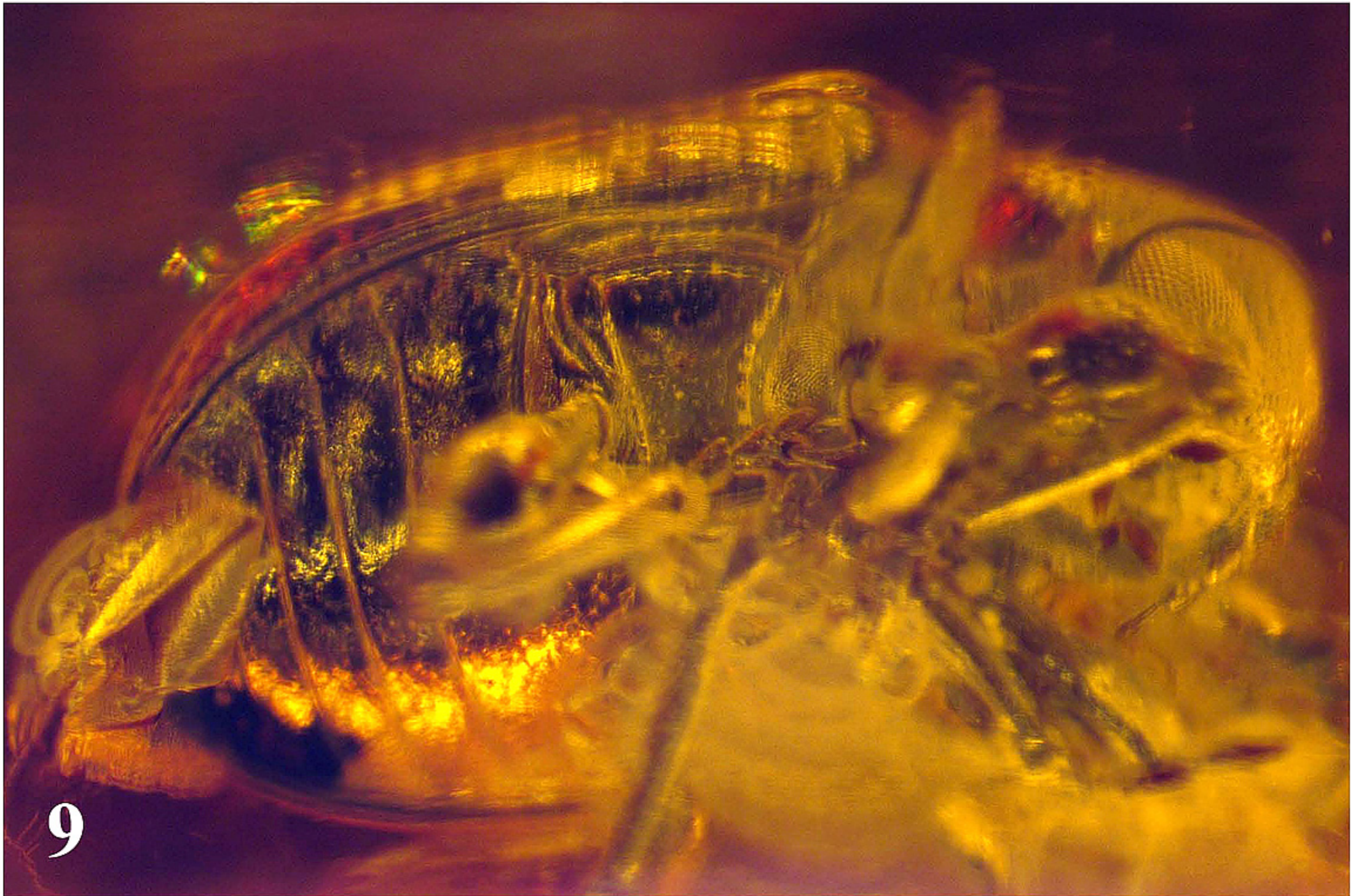
Etymology. Patronymic, this new species is named after Carsten Gröhn (Glinde, Germany), who enabled us to study these specimens.

Differential diagnosis. *Taphioporos carsteni* sp. nov. differs from *T. balticus* in having larger and denser pronotal punctation, and head with fine punctures; compared to *T. rufous* sp. nov., it differs in shape of convex part

of “propleura”, and in having slightly rounded lateral margins of pronotum, larger and denser punctation of abdomen, and black body coloration.



FIGURES 7–8. *Taphioporus carsteni* sp. nov., Holotype, C 923: 7—habitus, dorsal view; 8—habitus, lateral view.



FIGURES 9–11. *Taphioporos carsteni* sp. nov., Holotype, C 923: 9—habitus, ventral view; 10—pronotum, dorsal view; 11—head, frontal view.

Description. Holotype. Body length 3.3 mm, maximal width 1.6 mm, body shape forming elongate oval in dorsal view, moderately convex dorsally and ventrally; black in color, with palpomeres, antennae, tarsomere 4, and claws reddish–brown; glabrous (except abdomen and legs).

Head hypognathous, with fine and sparse punctures. Compound eyes medium-sized, moderately convex, slightly emarginate at antennal insertions. Paraocular grooves present. Clypeus with slightly emarginated anterior margin; clypeo-frontal suture absent. Antennae filiform, long; antennomere 11 elongated oval in outline, with pointed apex; antennae not clearly visible because of amber structure and specimen location within amber piece.

Pronotum transverse, about 1.5 times as wide as long, widest posteriorly, gradually narrowing anteriorly; with small (nearly as large as diameter of one compound eye facet) and dense punctures; distance between punctures

equal to 1–3 times diameter of one puncture; punctation distinctly sparser at base. Posterior margin sinuate, with distinct carinate border; lateral margins slightly rounded (in lateral view), with narrow carinate border; anterior margin arcuate, with narrow carina along border. Posterior and anterior angles widely rounded. Anterolateral sides of prosternum convex, with anterior margin slightly rounded, with well-pronounced antennal grooves, with few fine punctures, and strongly shagreened. Prohypomera with few fine punctures, shiny. Proventrite strongly shagreened. Procoxae nearly round, shagreened; procoxal cavities closed posteriorly.

Scutellum moderately large, transverse, about 1.3 times as wide as long, subtriangular with widely rounded apex, flat, impunctate. Elytra widely oval in outline, widest within apical one-third of length, with subparallel lateral sides, 1.5 times as long as wide, about 2.8 times as long as pronotum, with anterior margin distinctly wider than pronotum; humeral calli well-developed, distinctly projecting. Elytral punctures round, small (yet distinctly larger than pronotal punctures), dense, arranged in regular striae; distance between strial punctures equal to 1–2 times diameter of one puncture. Each elytron with 12 striae, stria 1 shortened (extending only in basal one-quarter of elytron), striae 1–6 and 12 reaching base of elytron, striae 11 and 12 fused in middle, but most striae are distinct throughout entire length of elytron; distance between striae approximately 2–3 times diameter of puncture; intervals slightly convex, smooth, shiny. Pygidium not exposed. Hind wings present.

Epipleura without punctures, widest in basal half, gradually narrowing posteriorly, and reaching elytral apex. Mesoventrite with strong, transverse microsculpture. Metepisterna about 5 times as long as wide, slightly dilated anteriorly; with row of fine punctures at exterior lateral margin (distinctly visible in posterior half); anterior margin oblique, lateral margins slightly emarginate. Metaventricle convex, almost impunctate (only with row of fine punctures at lateral and anterior margins), weakly shagreened. Metepisternum and metaventricle with well developed border along lateral margins. Coxae with strong microreticulation; mesocoxae oval; metacoxae elongated oval with transverse carina medially; distance between meso- and metacoxae nearly equal to 0.6 times transverse diameter of metacoxa.

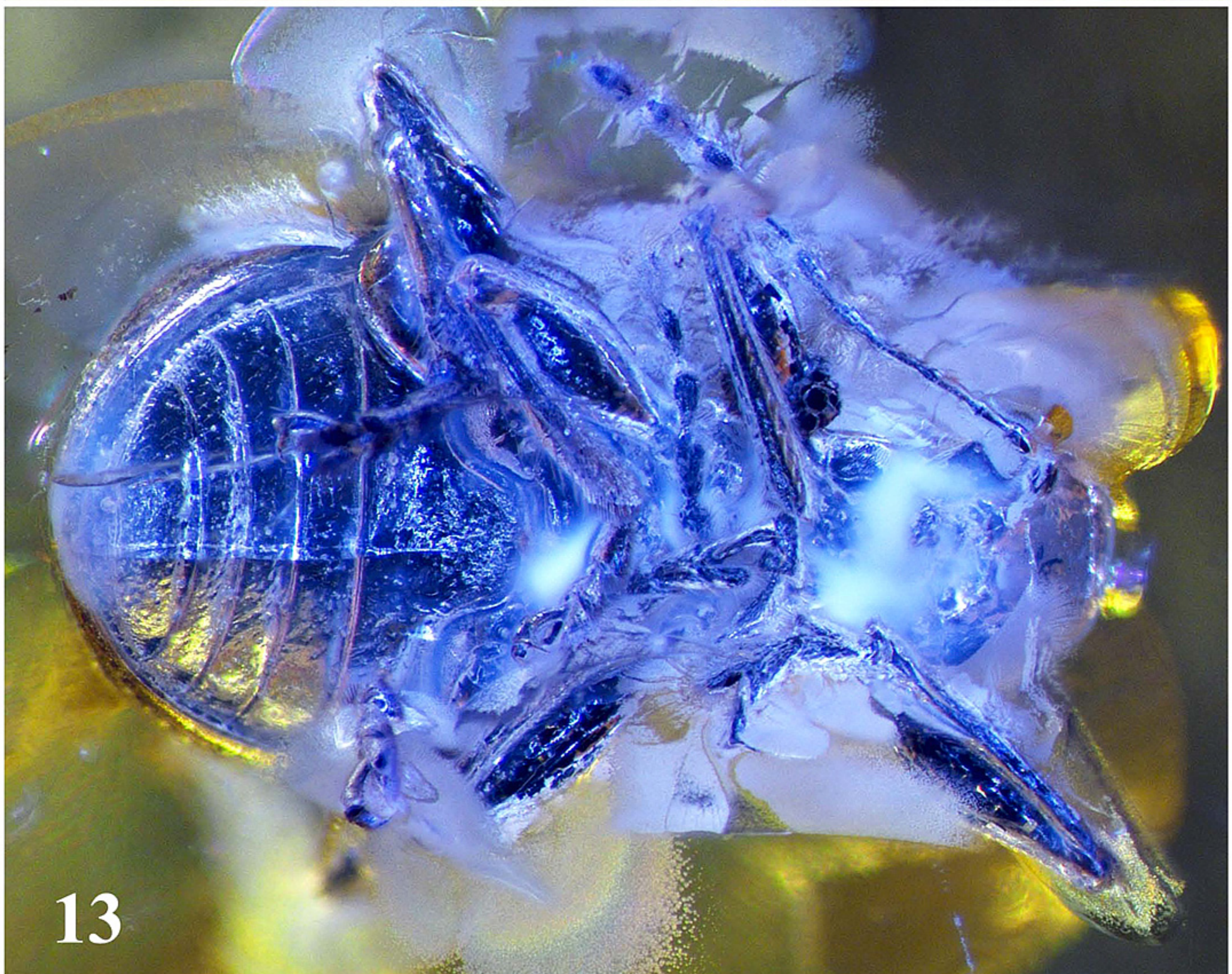
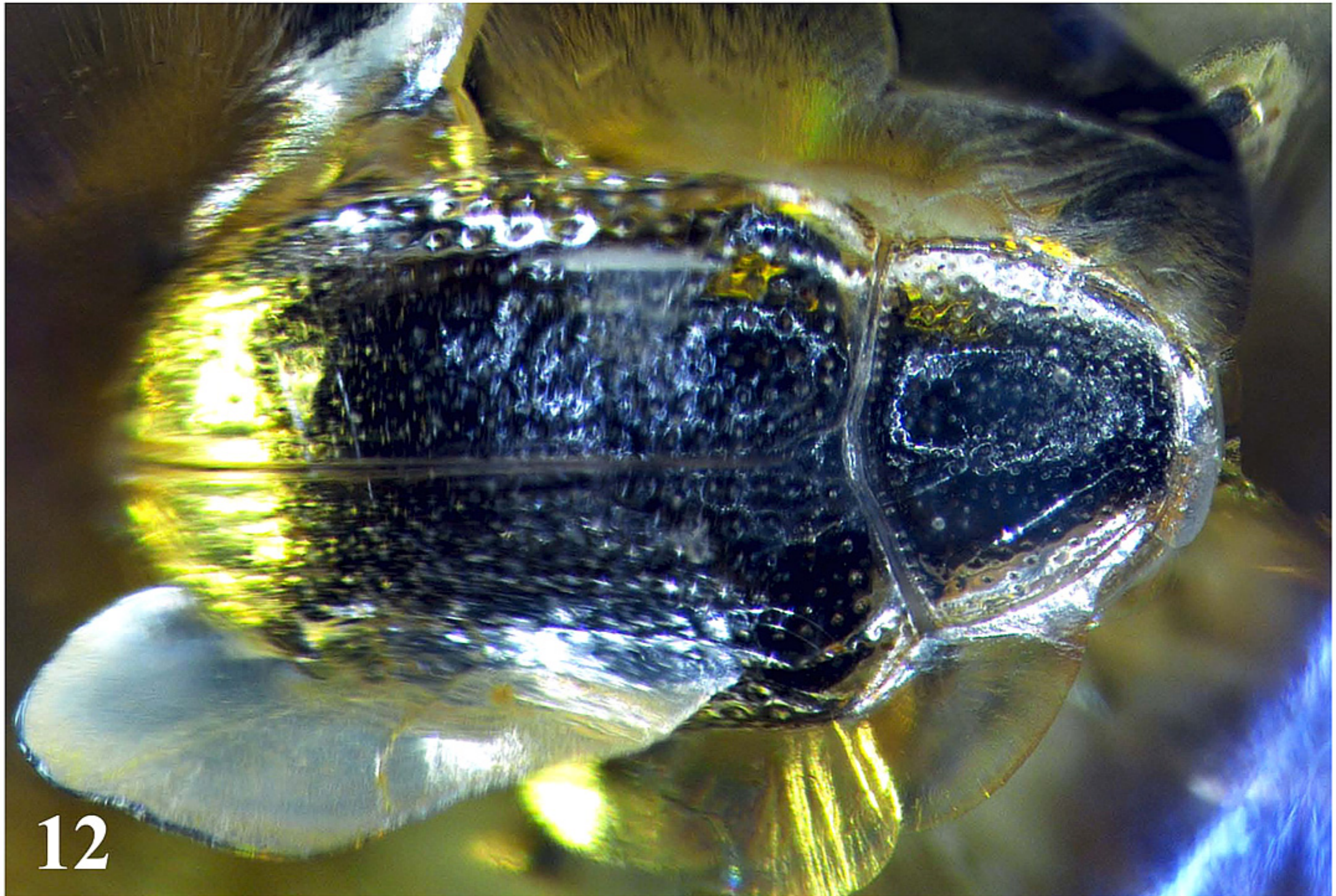
Abdomen with five ventrites, slightly convex; covered with small and dense punctures (nearly as large as pronotal punctures), and with fine, recumbent pale setae. Ventrite 1 the longest, about 2.4 times as long as ventrite 2; abdominal intercoxal process transverse, rectangular, with rounded anterior angles. Ventrites 2–4 subequal in length.

Legs relatively long and slender. Femora spindle-shaped, distinctly widened near mid-length; without teeth ventrally. Tibiae without preapical emargination, slightly widened apically, at apices with setae. Tarsomere 2 slightly bilobed, and 3 deeply bilobed. Metafemora 3.5 times as long as wide; metatibiae about 8 times as long as wide. Metatibiae nearly as long as metafemora; metatarsus about 0.7 times as long as metatibia. Relative length ratios of metatarsomeres 1–4: 9-6-5-8. Claws appendiculate, long.

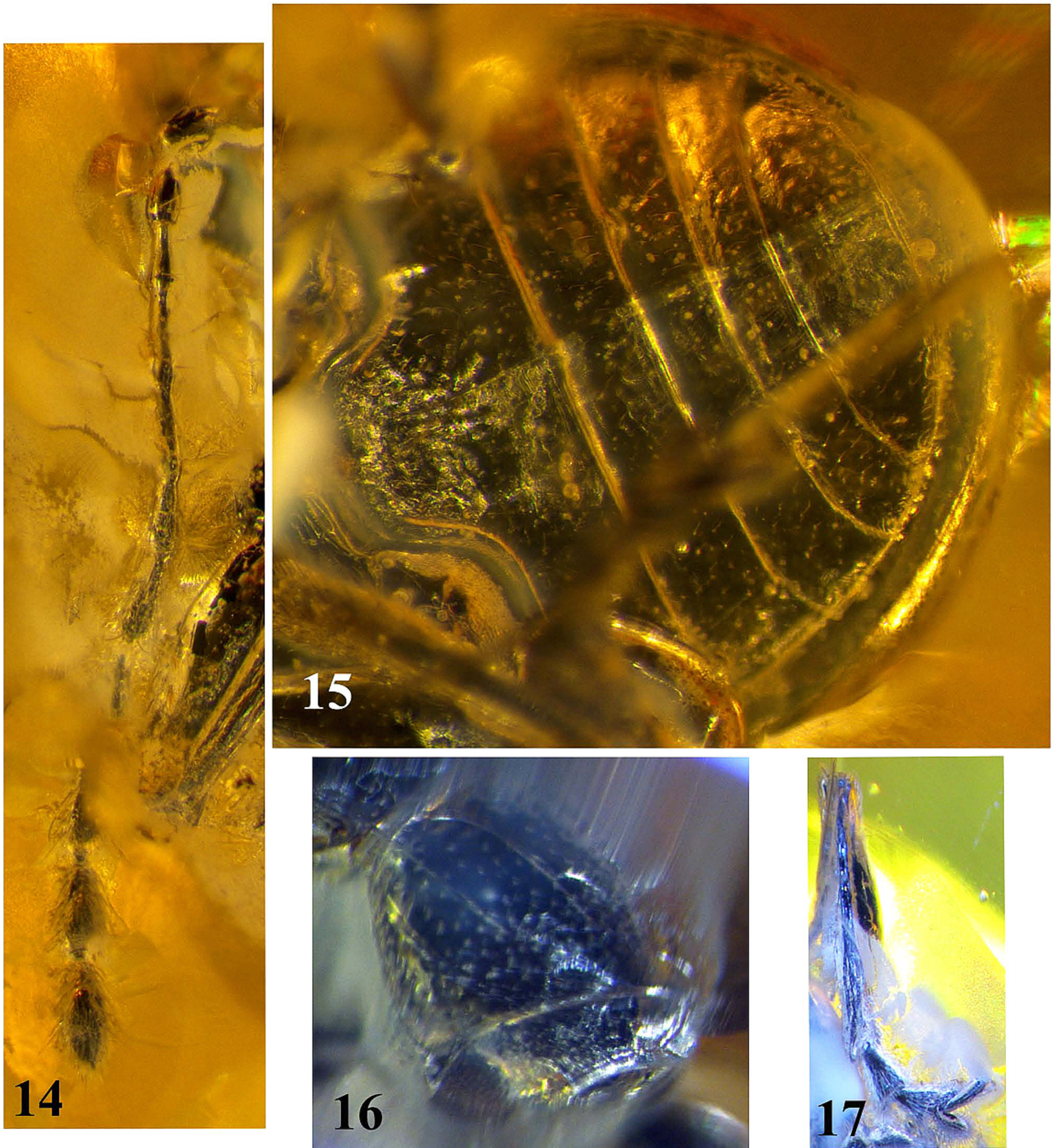
Paratype. Body length 3.3 mm, unicolorous black. Antennae filiform, long, extending nearly to middle of elytra; scape cylindrical, short; pedicel subequal in length and nearly 1.7 times as wide as antennomere 3; antennomeres 3–6 subcylindrical, slender; antennomere 7 distinctly dilated apically, about 2.8 times as long as wide, and nearly as long as antennomere 6; antennomeres 9–10 robust, dilated apically, subequal in shape and size, antennomere 9 about 2.2 times as long as wide; antennomere 11 elongated oval with pointed apex, about 2.4 times as long as wide, and 1.1 times as long as antennomere 10. Pubescence of abdomen more conspicuous than in holotype. Ventrite 5 with shallow, indistinct apical emargination. Relative length ratios of ventrites 1–5 (medially): 11-4-3-3-6.

A key to species of the genus *Taphioporus*

1. Head and pronotum with distinct punctures 2
- Head and pronotum with indistinct, fine punctures. Body length 2.9 mm. (Baltic amber) *T. balticus* Moseyko & Kirejtshuk
2. Anterolateral sides of prosternum (“propleura”) convex with anterior margin straight medially. Punctation of abdomen fine and sparse. Lateral margins of pronotum almost straight in posterior half. Coloration pale brown to reddish. Body length 3.25 mm. (Baltic amber) *T. rufous* sp. nov.
- Anterolateral sides of prosternum (“propleura”) convex, with anterior margin slightly rounded. Punctation of abdomen larger and denser. Lateral margins of pronotum slightly rounded. Coloration black. Body length 3.3 mm. (Baltic amber) *T. carsteni* sp. nov.



FIGURES 12–13. *Taphioporus carsteni* sp. nov., Paratype, C 1183: 12—habitus, dorsal view; 13—habitus, ventral view.



FIGURES 14–17. *Taphioporos carsteni* sp. nov., Paratype, C 1183: 14—right antenna; 15—abdomen; 16—head and pronotum, dorso-frontal view; 17—left protibia and protarsus.

Discussion

Subsequent to this work, three species of the fossil genus *Taphioporos* are known. It is interesting that these species were found in two distinct amber deposits, Baltic and Rovno amber, and that all of them have very constant generic characters. This combination of features allows us to consider the genus *Taphioporos* as well delimited and widely distributed in the Eocene. For the moment we can say that the Eumolpinae fauna in the Eocene appears to have been represented mostly by extinct genera. Only one species belonging to the extant genus *Colaspoides* Laporte, 1833 has been previously described with sufficient detail for confident systematic placement (Moseyko &

Kirejtshuk 2013). Earlier reports of extant genera of Eumolpinae from the Eocene (reviewed in Santiago-Blay 1994) must be re-identified to be sure of their taxonomic affiliation. Ultimately, this line of research will improve our understanding of how eumolpine diversity has changed since the Eocene.

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