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New Zopheridae (Coleoptera: Tenebrionoidea) from Baltic amber

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Abstract

Four new zopherid species are described and illustrated from Eocene Baltic amber: *Xylolaemus legalovi* **sp. nov.**, *X. richardklebsi* **sp. nov.**, *Diodesma slipinskii* **sp. nov.**, and *Endophloeus gorskii* **sp. nov.** A key to species of *Xylolaemus* Redtenbacher, described from Baltic amber, and a checklist of fossil Zopheridae are provided. The montane distribution of several recent representatives of dendrophilous zopherids in Europe and the connection of such a distributional type with modern human activity is discussed.

Key words: Zopherinae, Colydiinae, cylindrical bark beetles, ironclad beetles, new species, fossil resin, Tertiary, Eocene

Резюме

Из балтийского эоценового янтаря описано четыре новых вида жуков-зоферид: *Xylolaemus legalovi* **sp. nov.,** X. *richardklebsi* **sp. nov.,** *Diodesma slipinskii* **sp. nov.** и *Endophloeus gorskii* **sp. nov.** Приводятся определительный ключ для представителей рода *Xylolaemus* Redtenbacher балтийского янтаря и список ископаемых представителей семейства Zopheridae. Обсуждаются горное распространение некоторых современных представителей дендрофильных узкотелок в Европе и связь такого типа распространения с современной человеческой деятельностью.

Ключевые слова: Zopherinae, Colydiinae, узкотелки, новые виды, ископаемая смола, третичный период, эоцен

Introduction

Coleoptera inclusions in Baltic amber are currently attracting much attention and have been intensively studied, with descriptions of new taxa in various families taking place at an accelerated pace (Alekseev & Bukejs 2015; Alekseev & Grzymala 2015; Alekseev & Nabozhenko 2015; Alekseev & Telnov 2016; Bukejs & Alekseev 2015a, 2015b; Bukejs & Kirejtshuk 2015; Bukejs & Nadein 2015; Bukejs *et al*. 2015; Gamboa & Ortuño 2015; Háva & Damgaard 2015; Jałoszyński & Kubisz 2016; Legalov & Bukejs 2015; Schmidt & Faille 2015; Vitali 2015, *etc.*). Zopheridae belongs to one of the eight families of beetles that are poorly studied but comparatively well-represented in Baltic amber (Alekseev 2013). Only three species belonging to extant genera have been formally described (*Xylolaemus sakhnovi* Alekseev & Lord, 2014; *Pycnomerus simukovi* Alekseev, 2015; and *Bitoma glaesisepulta* Alekseev, 2015) from this Lagerstätte. The present paper is a continuation of a taxonomic study on fossil zopherid beetles from Eocene Baltic amber, containing descriptions of four new species with comments on two additional specimens that are left in a state of open nomenclature.

Material and methods

Eight zopherid inclusions from two private collections were examined during this study:

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CCHH Christel and Hans Werner Hoffeins (Hamburg, Germany)
CAG Andrzej Górski (Bielsko-Biała, Poland)

The specimens currently deposited in the private collection of CCHH amber (Nr. 572-2, Nr. 138-3, Nr. 731-1, Nr. 273-2, Nr. 181-3) will be given to the Senckenberg Deutsches Entomologisches Institut in Müncheberg, Germany (SDEI) as part of the institute's amber collection. Photos of these specimens were taken with a Zeiss AxioCamICc 3 digital camera mounted on a Zeiss Stemi 2000-stereomicroscope. Reconstructions were made based on free-hand drawings during examination of the specimens. The figures were edited using Adobe Photoshop CS8. All five examined amber pieces are embedded in blocks of GTS-polyester resin following the protocol described in Hoffeins (2001).

The specimens currently held in the private collection of CAG amber (Nr. 331, Nr. 8291, Nr. 8313) will subsequently be deposited in the collection of the Museum of Natural History, Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Kraków, Poland (ISZP). Observations of these specimens were made using a Nikon® SMZ 745T stereomicroscope. The photographs were taken using a Nikon SMZ 745T stereomicroscope with Nikon® DSFi1 digital camera.

Systematic Palaeontology

Zopheridae Solier, 1834

Colydiinae Billberg, 1820

Synchitini Erichson, 1845

Xylolaemus L. Redtenbacher, 1857

X. legalovi Alekseev & Bukejs sp. nov.
(Figs 1–3, 22)

Type material. Holotype: Nr. 572-2 [CCHH] "Holotype / *Xylolaemus legalovi* sp. nov. / des. Alekseev V.I. & Bukejs A." [red hand-written label]; sex unknown. Complete beetle is included in small, triangular, red amber piece embedded in block of GTS-polyester resin with dimensions 13 × 10 × 4 mm. Syninclusions consist of small pieces of organic material. Basal portion of head and anterior portion of pronotum are obscured by large wood piece; epipleura, abdomen, and ventral portions of thorax are not visible due to milky-white coating and near-opacities of amber matrix.

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

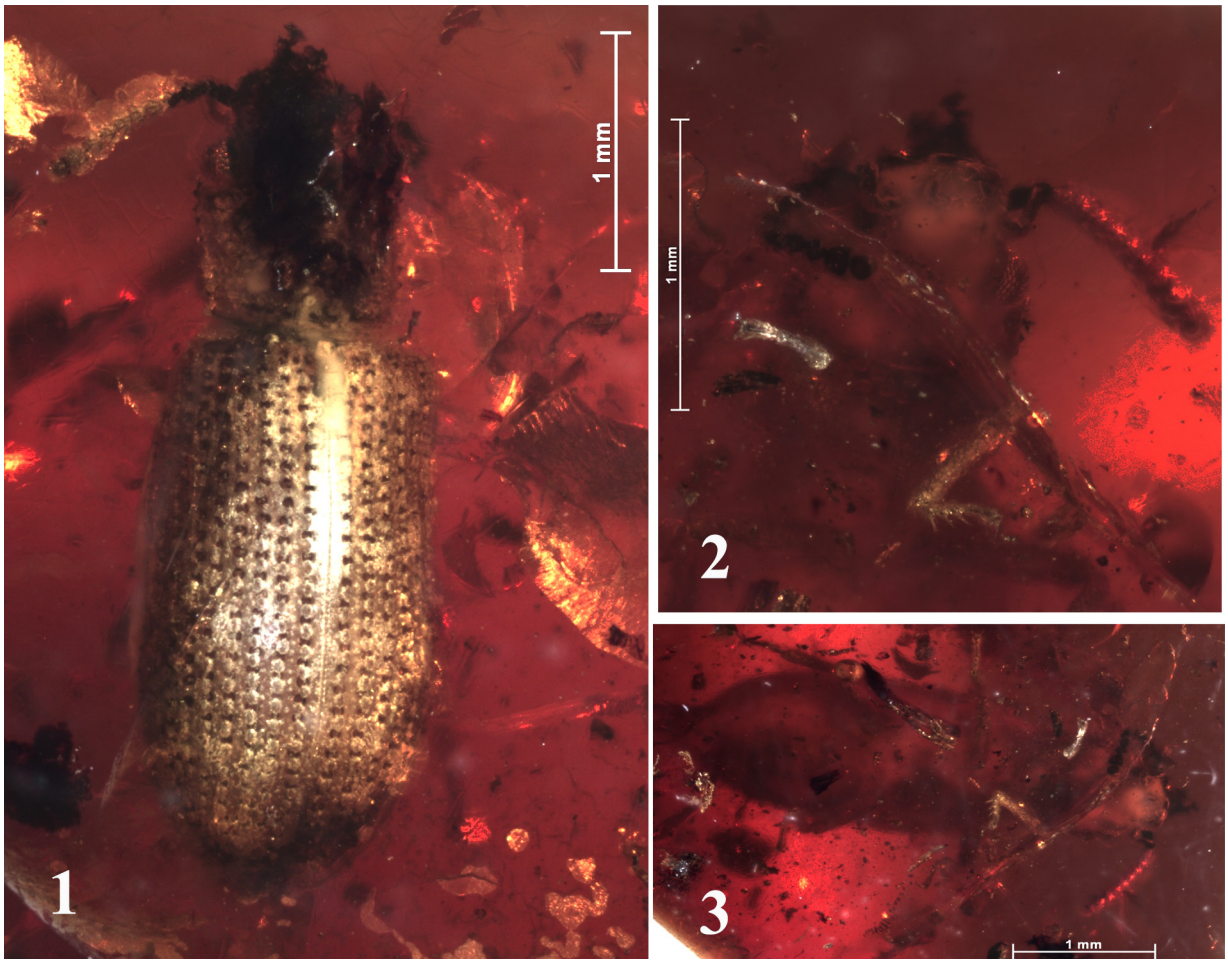
Type locality. Yantarny settlement (formerly Palmnicken), Sambian (Samland) Peninsula, Kaliningrad region, Russia.

Differential diagnosis. *Xylolaemus legalovi* **sp. nov.** differs from extant species of the genus in the following combination of characters: small body size, transverse pronotum with denticulate lateral margins, elytra with 14 fascicules (setose patches) and regular rows of oval recumbent scales. This new species can be distinguished from fossil *Xylolaemus sakhnovi* Alekseev & Lord, 2014 by its transverse dilated antennomere 10, and the form and sculpture of the pronotum and head. *Xylolaemus legalovi* **sp. nov.** is distinguished from *X. richardklebsi* **sp. nov.** by the presence of fascicules (setose patches) on the dorsal surface of the elytra, larger pronotal granulation, and the hemispherical antennomere 11.

Description. Body length about 3.5 mm, maximal width 1.3 mm; body elongate, nearly parallel-sided, flattened dorsally; body and appendages preserved with uniformly dark grey colour.

Head. Slightly longer than wide; widest between antennae, covered with moderately large, round unisetose granules. Anterior clypeal margin straight. Lateral margins convex above antennal insertions and narrowing to anterior margin. Eyes large, prominent, conical, with coarse facets. Interfacetal setae not apparent (even at 56× magnification). Maxillary palpus 4-segmented, short; palpomere 4 widely oval, mucronate, slightly longer and wider than palpomere 3. Labial palpus 3-segmented, palpomere 3 oval-shaped, 2× as long as palpomere 2.

Antennae short, extending to base of pronotum; 11-segmented, sparsely covered with dark, semierect setae; with distinct, finely pubescent, 2-segmented club. Scape, pedicel, and antennomeres 3–4 cylindrical; antennomeres 5–9 rounded, slightly wider than long; antennomere 10 transverse, dilated distally, 0.8× as long as wide; antennomere 11 hemispherical, almost as long as wide.



FIGURES 1–3. *Xylolaemus legalovi* **sp. nov.**, holotype: 1—habitus, dorsal view; 2—details of forebody, ventral view; 3—habitus, ventral view.

Thorax. Pronotum transverse, 1.3× as wide as long, widest in anterior one-third; pronotal disc slightly flattend, lateral sides explanate; densely covered with large unisetose granules (slightly larger than granules on frons), distance between granules smaller than diameter of one granule. Anterior margin arcuate; lateral margins nearly parallel-sided, denticulate (each with seven or eight denticles); posterior margin slightly rounded; anterior angles triangular, acute, prominent, reaching posterior one-third of eye; posterior angles obtuse. Sculpture of pronotal disc similar to head sculpture, but granules of disc larger and denser (distance between granules equal to 0.3–0.4× diameter of one granule).

Scutellum small, rounded. Elytra elongate (elytral length 2.3 mm, maximum elytral width 1.3 mm), convex, nearly parallel-sided, slightly wider than pronotum, jointly rounded apically. Humeral angles rounded. Each elytron with 10 rows of small, round punctures, distance between strial punctures equal to diameter of one puncture; intervals flat with fine secondary punctures in apical one-third of elytra, distance between striae approximately 1.5–2.0× diameter of single puncture. Elytra with rows of recumbent oval scales partially covering punctures dorsally and fascicules (setose patches) (Fig. 22), consisting of group of semirecumbent, pale, lanceolate scales. Scutellary striole apparent, consisting of three punctures. Hind wings not visible.

Abdomen. With five visible, similarly articulated ventrites.

Legs. Tarsi tetramerous. Metatarsomere 4 as long as metatarsomeres 1–3 combined; pro- and mesotarsomere 4 slightly shorter than combined length of tarsomeres 1–3. Tarsal claws simple, large, equal in size, length about one-third of tarsomere 4.

Etymology. Patronymic, this new species is dedicated to our dear colleague and expert in fossil weevils, Dr. Andrei A. Legalov (Novosibirsk, Russia).

***X. richardklebsi* Alekseev & Bukejs sp. nov.**
(Figs 4–6, 23)

Type material. Holotype: Nr. 138-3 [CCHH] "Holotype / *Xylolaemus richardklebsi* sp. nov. / des. Alekseev V.I. & Bukejs A." [red hand-written label]; sex unknown. Complete beetle with partially exposed hind wings and distal portion of genitalia visible, included in small, transparent yellow amber piece embedded in GTS-polyester resin block with dimensions 15 × 7 × 6 mm. Syninclusions (except one gas bubble) are absent—amber piece with inclusion may have been thermally processed in autoclave.

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

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

Differential diagnosis. *Xylolaemus richardklebsi* **sp. nov.** differs from extant and fossil species of the genus in the following combination of characters: pronotum with longitudinal impression medially; setae on elytra long and strongly curved; pronotal granulation dense; prosternal process dilated; fascicules (setose patches) on elytra absent; antennae 11-segmented with antennomere 10 dilated and transverse.

Description. Body length about 4.1 mm, maximal width 1.4 mm; elongate, nearly parallel-sided, flattened dorsally; body and appendages appear uniformly black.

Head. Longer than wide; widest between antennae; covered with moderately large, round, unisetose granules. Anterior clypeal margin straight, covered with thin setae. Lateral margins convex above antennal insertions and narrowing to anterior margin. Eyes large, prominent, hemispherical, with coarse facets; interfacetal setae apparent. Maxillary palpus 4-segmented, short; palpomere 4 oval-shaped, slightly longer and narrower than palpomere 3. Labial palpus 3-segmented, palpomere 3 oval, as long as penultimate palpomere. Antennae short, extending to basal half of pronotum; 11-segmented with distinct, 2-segmented, finely pubescent antennal club, sparsely covered with dark, semierect setae. Scape, pedicel and antennomeres 3–4 elongate, conical; antennomeres 5–9 transverse; antennomere 10 transverse, dilated distally, 0.7× as long as wide; antennomere 11 widely ovate with rounded apex, slightly longer than wide.

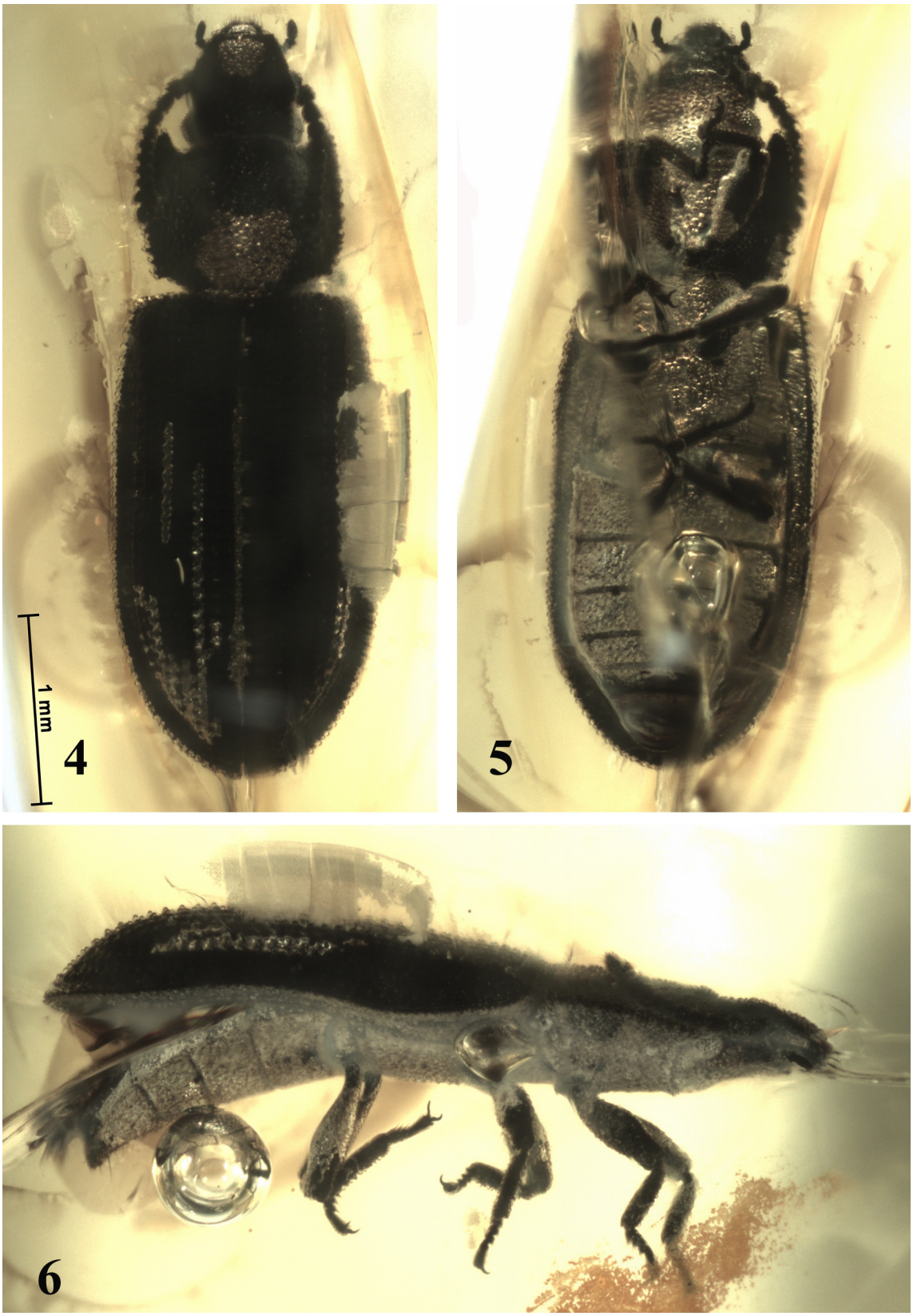
Thorax. Pronotum transverse, 1.3× as wide as long, widest at middle; pronotal disc convex with longitudinal impression at middle, lateral sides explanate; densely covered with unisetose granules (slightly smaller and distinctly denser than granules on frons). Anterior margin arcuate; lateral margins nearly parallel-sided, finely denticulate (about 12 small denticles), with each denticle bearing short seta; posterior margin rounded; anterior angles triangular, acute, prominent, reaching posterior half of eye; posterior angles obtuse. Prosternum densely covered with granules (sparser than pronotal granulation); procoxa nearly round, shagreened. Granules of meso- and metasternum flatter than those of prosternum. Procoxal cavities externally open, meso- and metacoxal cavities closed; all coxae narrowly separated from each other. Prosternal process oblong parallel-sided between procoxae and then strongly dilated,with widely rounded apex.

Scutellum small, rounded. Elytra elongate (length 2.7 mm, maximum width 1.4 mm), nearly parallel-sided, flattened dorsally, slightly wider than pronotum, jointly rounded apically. Humeral angles rounded. Each elytron with 10 rows of small, round punctures, distance between strial punctures equal to diameter of one puncture; intervals flat, distance between striae approximately 1.5–2.0× diameter of single puncture. Striae with small regular tubercles, bearing long, strongly curved setae. Scutellary striole apparent, consisting of four punctures. Epipleura well-developed, reaching apex of elytra, widest at humeral angle. Hind wings apparent. Ratio of lengths of mesoventrite to metaventrite to abdomen: 3-5-14.

Abdomen. With five visible, similarly articulated ventrites. Ventrite length ratios: 6-4-5-3-3. Setation of ventrites 1–4 not apparent (possibly absent); ventrite 5 rounded apically, finely pubescent, with two long, erect setae near apical margin, length of setae approximately 0.14 mm. Intercoxal process of abdominal ventrite 1 acute.

Legs. Profemora thickened medially; tibiae covered with curved setae. Tarsi tetramerous. Metatarsomere 4 as long as metatarsomeres 1–3 combined; pro- and mesotarsomeres 4 slightly shorter than combined length of tarsomeres 1–3. Tarsal claws simple, large, equal in size, with length about one-third of tarsomere 4.

Etymology. Patronymic, this new species is dedicated to Professor Dr. Richard Hermann Erdmann Klebs (1850–1911) from Königsberg, a world-renowned East-Prussian expert of Baltic amber and inclusions.



FIGURES 4–6. *Xylolaemus richardklebsi* **sp. nov.**, holotype: 4—habitus, dorsal view; 5—habitus, ventral view; 6—habitus, lateral view.

A key to species of *Xylolaemus* described from Baltic amber

1. Antennal club weak, loose, with segment 10 not dilated; pronotum without impression medially; elytra without fascicules; body length 3.2 mm . . . . . ***X. sakhnovi* Alekseev & Lord**
- Antennal club distinct, with segment 10 dilated; body length greater than 3.2 mm 2
2. Elytra with fascicules and regular rows of ovate, recumbent scales; pronotum covered with large granules and with seven or eight denticles laterally; body length 3.5 mm . . . . . ***X. legalovi* sp. nov.**
- Elytra without fascicules, with regular rows of curved setae; pronotum with longitudinal impression at middle, covered with small granules and with 12 small denticles laterally; body length 4.1 mm . . . . . ***X. richardklebsi* sp. nov.**

Diodesma Latreille, 1829

D. slipinskii Alekseev & Bukejs sp. nov.

(Figs 7–9, 24)

Type material. Holotype: Nr. 731-1 [CCHH] "Holotype / *Diodesma slipinskii* sp. nov. / des. Alekseev V.I. & Bukejs A." [red hand-written label]; sex unknown. Complete beetle is included in a small, transparent, yellow amber piece embedded in block of GTS-polyester resin with dimensions 18 × 6 × 6 mm. Syninclusions are seven stellate Fagacean hairs and one mite (length 0.35 mm). Amber piece with inclusion possibly thermally treated in autoclave.

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

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

Differential diagnosis. *Diodesma slipinskii* **sp. nov.** differs from extant species of the genus in the following combination of characters: pronotum with protruding anterior angles; lateral sides of pronotum weakly explanate and flattened anteriad; elytra with small punctures; antennomere 10 subquadrate.

Description. Body length about 2.25 mm, maximum height and width (at middle of elytra) 0.68 and 0.95 mm respectively; body elongate, strongly convex dorsally, flattened ventrally; body and appendages apparently uniformly black in colour.

Head. 1.5× as wide as long; distinctly widest between antennae; vertex covered with dense, small, round, unisetose granules; frons and clypeus sparsely punctured and setose. Anterior clypeal margin widely rounded. Eyes large, prominent, conical, with coarse facets; interfacetal setae not apparent; distance between eye and antennal insertion slightly shorter than scape length. Maxillary palpus 4-segmented, short; palpomere 4 broad, oval-shaped. Labial palpus 3-segmented, palpomere 3 largest, ovate. Antennae short, extending to middle of pronotum; 11-segmented with 2-segmented club, densely covered with dark, straight semierect setae. Scape, pedicel and antennomere 3 elongate; antennomeres 4–9 transverse; antennomere 10 subquadrate; antennomere 11 rounded. Antennomere length ratios: 6-5-5-4-4-3-3-3-3-5-3.

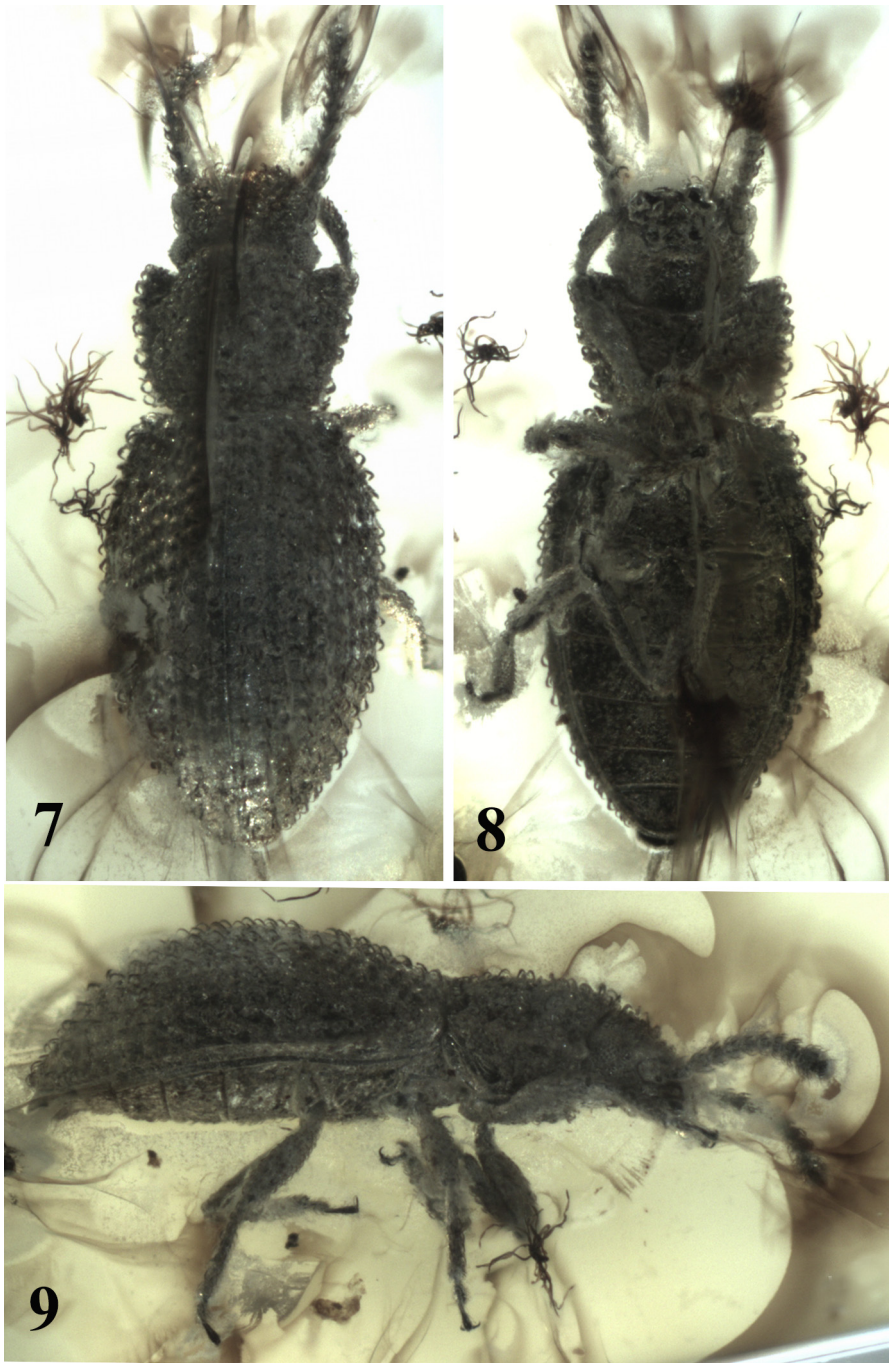
Thorax. Pronotum transverse, 1.2× as wide as long, widest at middle; pronotal disc convex, densely covered with unisetose granules (distinctly larger than granules on head). Lateral sides weakly explanate and flattened anteriad. Anterior margin arcuate; lateral and posterior margins rounded; anterior angles triangular, acute, prominent, reaching middle of eye; posterior angles obtuse. Pro-, meso- and metasternum weakly rugose. Procoxal cavities open posteriorly, meso- and metacoxal cavities closed. All coxae separated: procoxae by elongate (3:1 length to width ratio), parallel-sided prosternal process; mesocoxae by distance approximately 0.3 of coxal diameter; metacoxae by intercoxal process of ventrite 1 (slightly narrower than metacoxal diameter).

Scutellum small, indistinct. Elytra ovate, length 1.5 mm, width 0.95 mm; strongly convex dorsally, slightly wider than pronotum at humeri, jointly rounded apically; weakly rugose at disc and crenulated laterally in basal one-fourth of length. Humeral angles rounded. Each elytron with 10 rows of small, round punctures, distance between strial punctures equal to 1.5–2.0× diameter of one puncture; intervals flat, distance between striae approximately 3–4× diameter of single puncture. Strial punctures bearing long, curved setae. Scutellary striole not apparent. Epipleura well-developed, reaching apex of elytra, widest at humeral angle. Hind wings not apparent. Ratio of lengths of mesoventrite to metaventrite to abdomen: 3-3-14.

Abdomen. With five visible, similarly articulated ventrites. Ventrite length ratios: 22-14-11-9-10. Setation of ventrites not apparent (possibly absent); ventrite 5 rounded apically. Intercoxal process of abdominal ventrite 1 rounded.

Legs. Tarsi tetramerous. Length of apical tarsomere equal to combined length of tarsomeres 1–3; tarsomere 3 smallest. Tarsal claws simple, large, equal in size, with length about one-third of tarsomere 4.

Etymology. Patronymic, this new species is named in honor of a renowned coleopterist and specialist on zopherid beetles, Dr. Adam Ślipiński (CSIRO, Canberra, Australia)



FIGURES 7–9. *Diodesma slipinskii* **sp. nov.**, holotype: 7—habitus, dorsal view; 8—habitus, ventral view; 9—habitus, lateral view.

***Endophloeus* Dejean, 1834**

***E. gorskii* Alekseev & Bukejs sp. nov.**
(Figs 13–21)

Type material. Holotype: Nr. 8291 [CAG], "Holotype / *Endophloeus gorskii* sp. nov. / des. Alekseev V.I. & Bukejs

A." [red printed label]; male. Complete beetle with partially exposed aedeagus is included in a small, transparent, square amber piece (6 × 6 × 4 mm), that is yellowish in colour, and preserved without supplementary fixation. Syninclusions include a few stellate Fagaceae trichomes and two gas vesicles.

Paratype: Nr. 8313 [CAG], "Paratype / *Endophloeus gorskii* sp. nov. / des. Alekseev V.I. & Bukejs A." [red printed label]; male. Complete beetle with partially exposed aedeagus, included in a small, transparent, subtriangular amber piece (23 × 13 × 7 mm), that is yellowish in colour, and preserved without supplementary fixation. Ventral anterior portion of the specimen is obscured by "milky" amber opacity. Syninclusions is one specimen of Nematocera (Diptera), one damaged ant specimen (Hymenoptera: Formicidae), and few small gas vesicles.

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

Type locality. Baltic Sea coast, Gdańsk, Poland; Baltic amber, Upper Eocene, Prussian Formation.

Differential diagnosis. *Endophloeus gorskii* **sp. nov.** differs from extant species of the genus in the following combination of characters: pronotal admedian costae joined together in posterior half; elytral interval 3 with ridge-like protuberances basally; pronotum densely granulated; elytra with short scale-like setae; and smaller body size (2.8–3.0 mm).

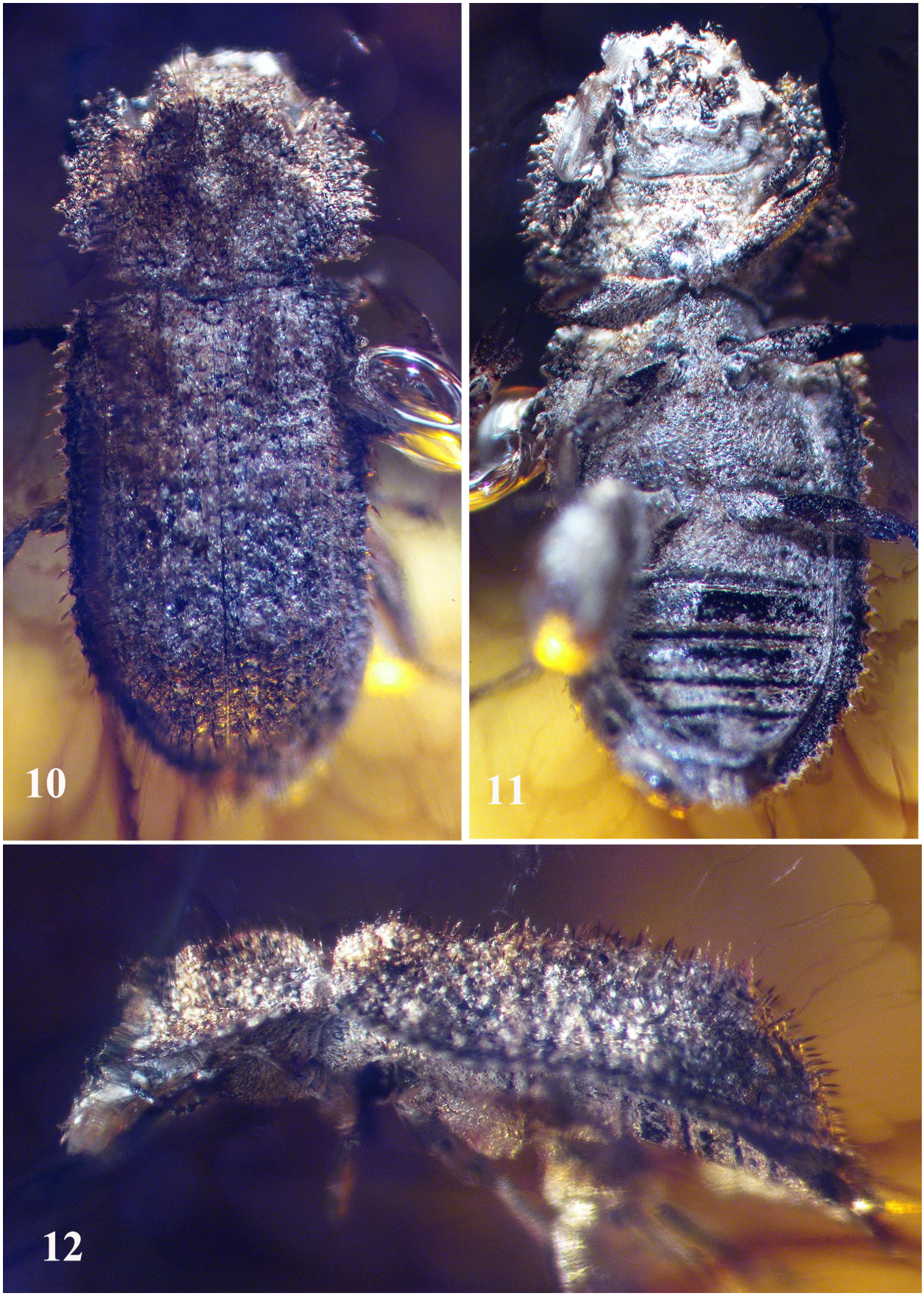
Description. Body length about 2.9 mm, maximal width 1.3 mm; body elongate, nearly parallel-sided, convex dorsally and almost flat ventrally; unicolorous black.

Head. Broad, distinctly widened in front of eyes, with anterior portion flat and frons slightly convex; lateral margins convex above antennal insertions and narrowing to anterior margin; covered with moderately large round granules, each bearing lanceolate scale-like seta. Compound eyes small, moderately convex; interfacetal setae not apparent. Clypeus transverse, slightly convex, anteriorly straight; covered with pale setae (distinctly longer than scale-like setae). Maxillary palpi 4-segmented, short; palpomere 4 widely ovate with pointed apex, about 1.8× as long as wide, distinctly longer than palpomeres 2–3 combined. Labial palpus 3-segmented, palpomere 3 oval-shaped and largest. Antennae short, extending to base of pronotum; 11-segmented with distinct 2-segmented club, sparsely covered with dark, semierect setae; scape and pedicel subcylindrical, nearly equal in length (not distinctly visible in examined specimen); antennomere 3 elongate, about 1.5× as long as antennomere 4, and distinctly narrower than pedicel; antennomeres 4–9 subequal in size and shape, slightly dilated distally, antennomere 9 narrow, 0.6× as wide as antennomere 10; antennomere 10 transverse, dilated distally, 0.7× as long as wide; antennomere 11 widely ovate with rounded apex, 1.9× as long as wide, and 1.5× as long as antennomere 10.

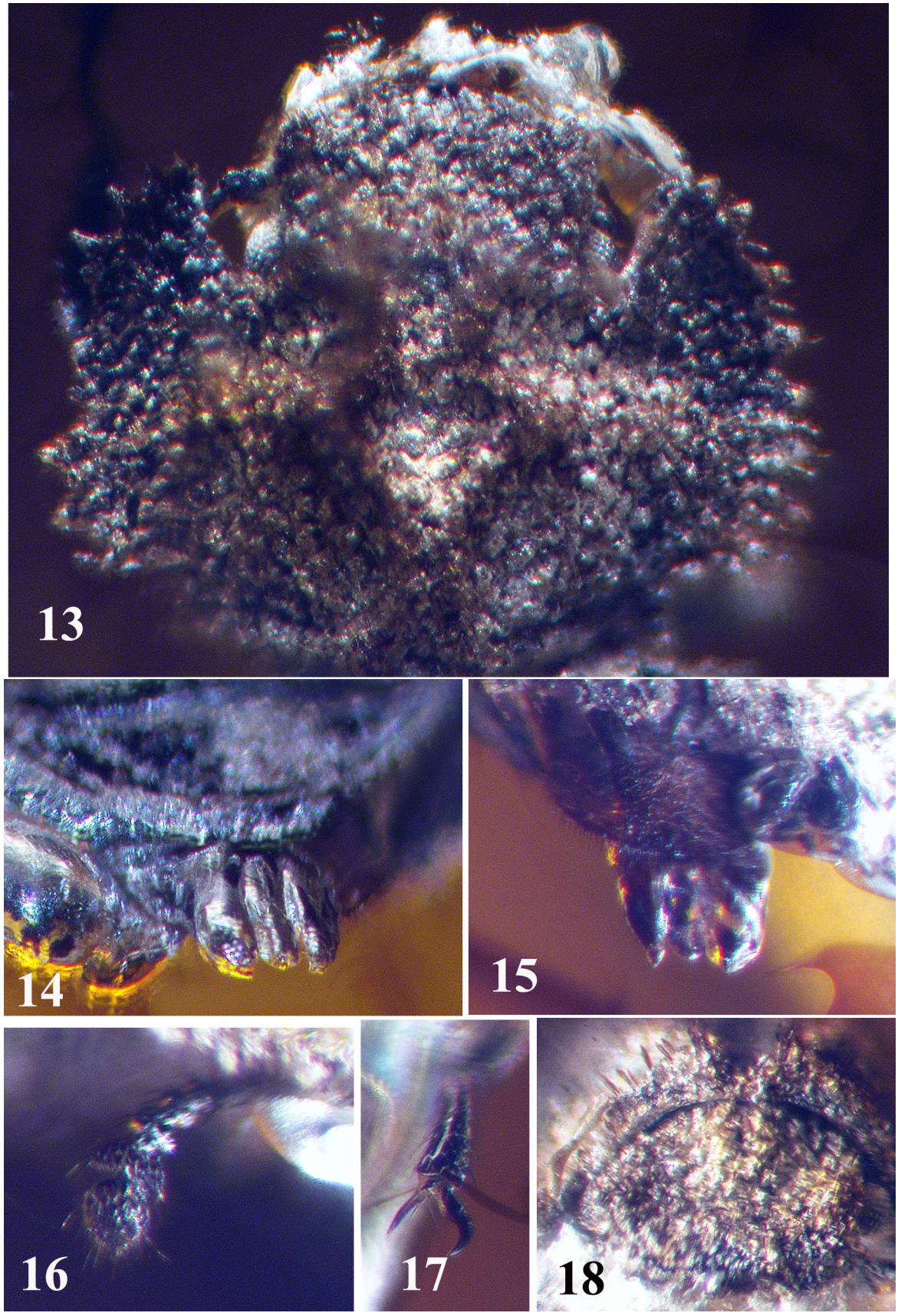
Thorax. Pronotum transverse, 1.6× as wide as long, widest in posterior one-third, almost as wide as elytra; pronotal disc convex, lateral sides widely explanate; densely covered with large granules (slightly larger than granules on frons), distance between granules smaller than diameter of one granule, each granule bearing lanceolate, scale-like, erect seta. Anterior margin arcuate, convex with shallow emargination medially; lateral margins widely convex, denticulate, each denticle bearing lanceolate scale-like seta; posterior margin convex. Anterior angles acute, strongly protruding; posterior angles indistinct. Pronotal sub-basal sulcus distinct. Pronotal disc with two admedian costae: parallel and narrowly separated in anterior one-fourth, curved outward and forming rounded area between costae near midlength, joined together in posterior portion, and narrowly separated at posterior margin. Prosternum densely covered with granules; procoxa nearly round, shagreened; procoxal cavities open posteriorly; prosternal process moderately large, about 1.3× as wide as transverse diameter of procoxa, lateral margins almost straight, posterior margin slightly projecting posteriorly.

Scutellum small, subpentagonal, with sparse short setae. Elytra almost parallel-sided, tapered at apex, strongly convex with explanate lateral sides; about 1.6× as long as wide. Humeral angles rounded. Basal margin concave in scutellar area, with small denticles; lateral margins denticulate, each denticle bearing lanceolate scale-like seta; in basal half, denticles as large as those on pronotal lateral margins, gradually becoming smaller apicad. Punctures arranged in regular striae, each puncture with lanceolate, scale-like, erect seta; intervals flat; sutural interval with fine setae (distinctly visible in basal half); distance between striae approximately 1.5–2× diameter of single puncture. Scutellary striole absent. Elytral surface not clearly visible in examined specimen because of milky amber coating. Intervals 3 and 7 with ridge-like protuberances basally, interval 5 with less distinct protuberance at base, intervals 2–5 with few additional small protuberances medially and apically, some indistinct; protuberances bearing lanceolate scale-like erect setae.

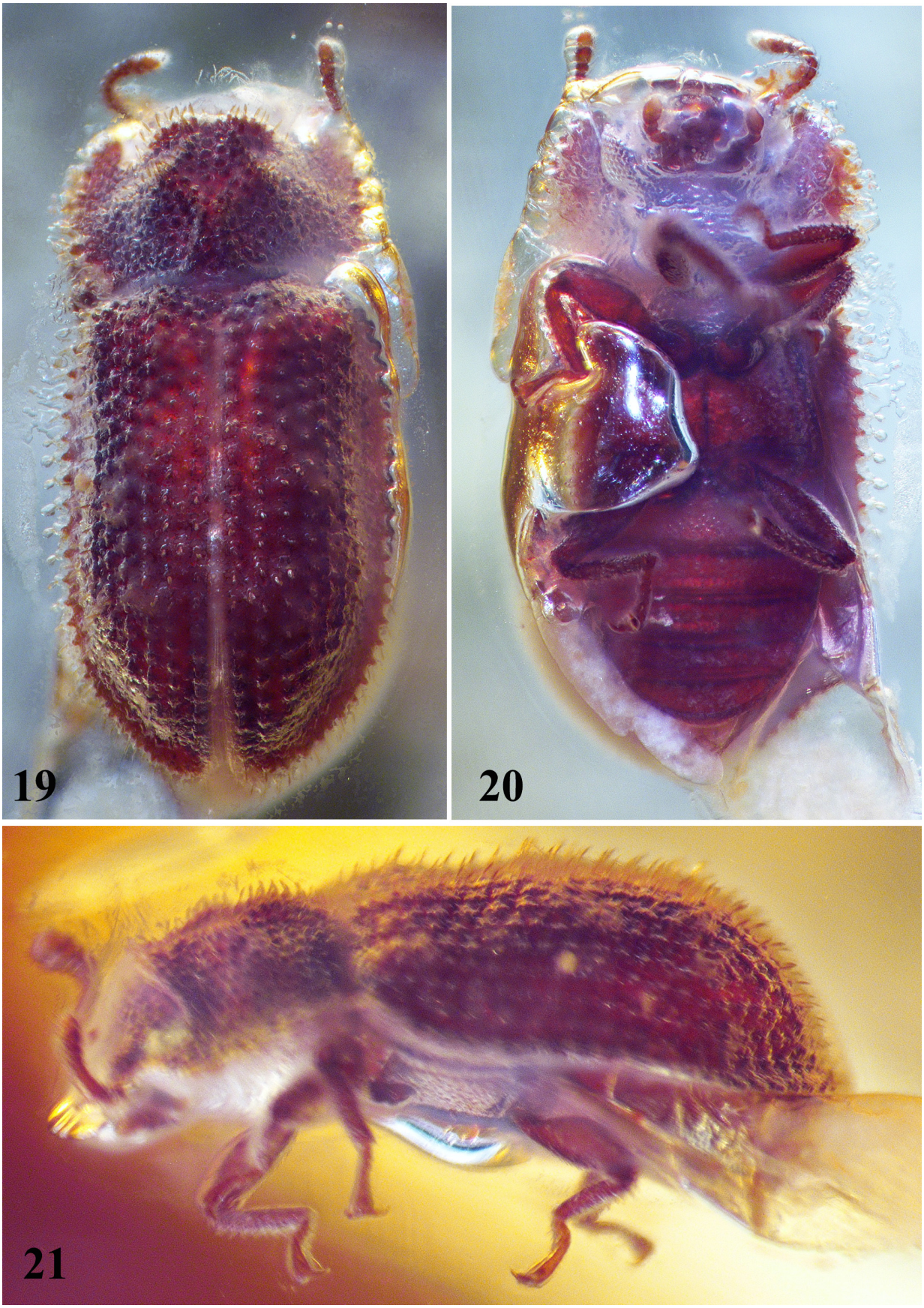
Epipleura with small granules; wide, in basal one-fourth about 2.2× as wide as metepisternum; widest in basal half, slightly narrowing posteriorly, reaching elytral apex. Mesosternum shorter than ventrite 1, densely covered



FIGURES 10–12. *Endophloeus gorskii* **sp. nov.**, holotype: 10—habitus, dorsal view; 11—habitus, ventral view; 12—habitus, lateral view.



FIGURES 13–18. *Endophloeus gorskii* **sp. nov.**, holotype: 13—head and pronotum, dorsal view; 14—apical portion of abdomen with partly exposed aedeagus, ventral view; 15—apex of aedeagus, dorsal view; 16—apical portion of right antenna; 17—last mesotarsomere and claws; 18—details of head, frontal view.



FIGURES 19–21. *Endophloeus gorskii* **sp. nov.**, paratype: 19—habitus, dorsal view; 20—habitus, ventral view; 21—habitus, lateral view.

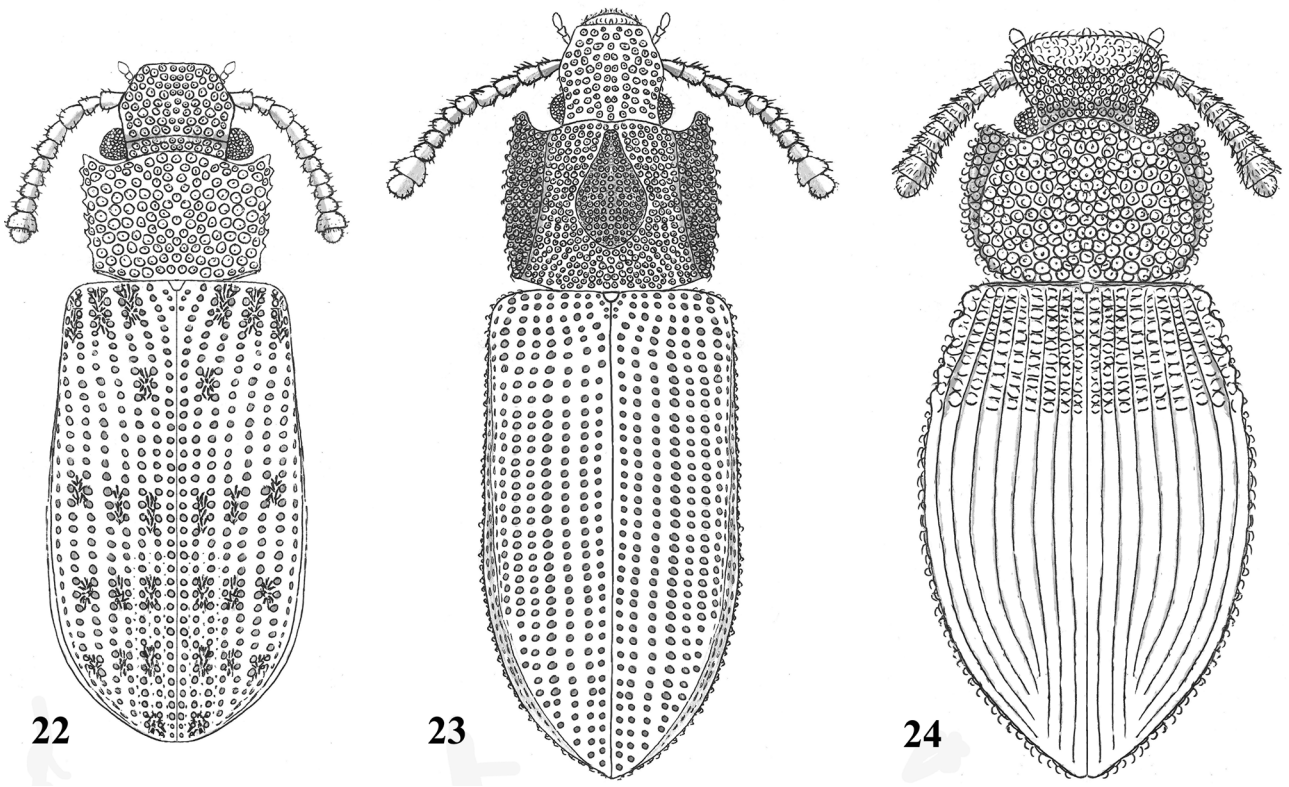
with granules; mesocoxa nearly round, distance between mesocoxae narrower than transverse diameter of masecoxa. Metaventrite slightly convex, with small granules; metacoxae transverse, elongate; metepisternum narrow, about 6× as long as wide, slightly dilated anteriad, with small granules, anterior margin oblique, lateral margins slightly emarginate. The ratio of lengths of mesoventrite to metaventrite to abdomen: 3-5-11.

Abdomen. With sparse, fine punctures; abdominal intercoxal process narrow, triangular. Ventrite 5 with widely rounded posterior margin. Ventrite length ratios: 20-17-15-12-20. Apex of aedeagus (Fig. 14–15).

Legs. Short, femora slightly widened; femora and tibiae subequal in length, with lanceolate scale-like setae dorsally, remaining surface with fine setae; tibiae straight. Tarsi tetramerous. Tarsi nearly 0.8× as long as tibia, tarsomeres 1–3 short, subequal in lenght, tarsomere 4 about 1.5× as long as tarsomeres 1–3 combined. Claws large, simple, dilated at base.

Note: Paratype slightly differs from holotype: body length 2.8 mm, maximal width 1.3 mm; appearing unicolorous rufous. Elytral punctures arranged in 9 regular striae. Pronotal costae and elytral protuberances less convex and distinct than in holotype. In our opinion, both studied specimens are conspecific.

Etymology. Patronymic, this new species is named after Andrzej Górski (Bielsko-Biała, Poland), who enabled us to study these specimens.



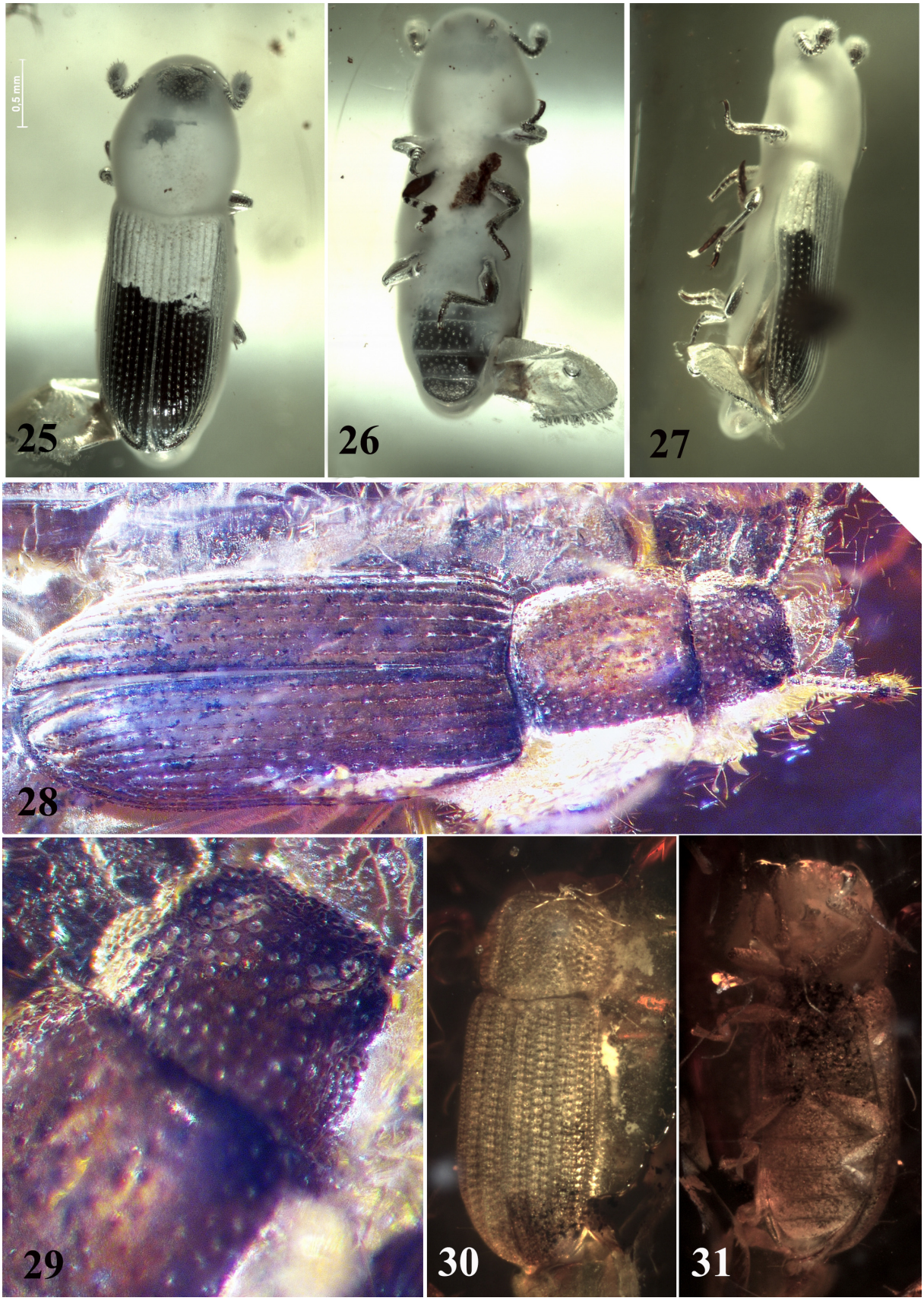
FIGURES 22–23. Reconstructions of habitus, dorsal view: 22—*Xylolaemus legalovi* **sp. nov**.; 23—*X. richardklebsi* **sp. nov**.; 24—*Diodesma slipinskii* **sp. nov**.

Additional fossil records of Zopheridae

Zopherinae Solier, 1834

Pycnomerini Erichson, 1845

Pycnomerus Erichson, 1842



FIGURES 25–31. Fossil Zopheridae. 25–27—*Pycnomerus* sp., specimen No. 273-2 [CCHH]: 25—habitus, dorsal view, 25—habitus, ventral view, 25—habitus, lateral view; 28–29— *Pycnomerus simukovi* Alekseev, specimen No. 331 [CAG]: 28—habitus, dorsal view, 29—details of head and pronotum, dorsal view; 30–31—Synchitini gen. and sp., specimen No. 181-3 [CCHH]: 30—habitus, dorsal view, 31—habitus, ventral view. Not reproduced to the same scale.

***Pycnomerus simukovi* Alekseev, 2015**
(Figs 28–29)

Material examined. One specimen with collection number 331 [CAG], Baltic amber, Gdańsk, Poland. Complete beetle is included in small, transparent, subrectangular amber piece (15 × 11 × 3 mm), that is yellowish in colour, and preserved without supplementary fixation. Ventral portion of specimen is partially obscured by "milky" opacity within amber. Syninclusions consist of few stellate Fagaceae trichomes and small gas vesicles.

Note. Body length of beetle is 3.1 mm; rufous. This specimen has pronotal punctation sparser than in the holotype.

***Pycnomerus* sp.**
(Figs 25–27)

Material examined. One specimen of *Pycnomerus* sp. with collection number 273-2 [CCHH], Baltic amber, Yantarny, Kaliningrad region, Russia. Complete beetle with partially exposed hind wings, included in small, transparent, yellow amber piece embedded in block of GTS-polyester resin with dimensions 13 × 10 × 4.5 mm. Body length of beetle is 3.0 mm, maximum body width is 1.0 mm. Syninclusions consist of stellate Fagaceae trichomes.

Note. The specimen belongs to an undescribed species of the genus. The beetle clearly differs from *P. simukovi* Alekseev in having ferrugineous integument, oblique pits on the forehead, a distinctly wider habitus, the pronotum apparently as long as wide, and a different punctation of the dorsal surface. Unfortunately, the important thoracic diagnostic characters are invisible on the specimen because of a dense milky-white coating of decay products within the surrounding amber. The beetle cannot be named to species and formally described at present.

Colydiinae Billberg, 1820

Synchitini Erichson, 1845

(?)*Bitoma* sp.
(Figs 30–31)

Material examined. One specimen with collection number 181-3 [CCHH], Bitterfeld amber, Goitzsche, Sachsen-Anhalt, Germany. Complete beetle included in small, reddish amber piece embedded in block of GTS-polyester resin with total dimensions 13 × 9 × 3 mm. Body length is approximately 2.0 mm, maximum body width is 0.79 mm. Syninclusions consist of stellate Fagaceae trichomes.

Note. The specimen belongs to an undescribed species that is possibly of the genus *Bitoma* Herbst, 1793 (or possibly *Paha* Dajoz, 1984 or *Lasconotus* Erichson, 1845, which are similar in general appearance). The beetle clearly differs from *Bitoma glaesisepulta* Alekseev, 2015, but unfortunately, the important diagnostic characters (e.g., antennae) are not distinctly visible on the specimen. There is no mistaking the assignment of the specimen to the tribe Synchitini, but the beetle cannot be named to genus and formally described at present.

Discussion

Checklist of fossil Zopheridae. Hope (1842) described *Monomma resinorum* (Monommidae) with the note "probably from copal". This taxon belongs to the tribe Monommatini Blanchard, 1845 within Zopheridae: Zopherinae (see Bouchard *et al.* 2011). According to Freude (1952), the species described from sub-fossil resin as *Monomma resinorum* Hope is the recent taxon *M. brunneum resinorum* Hope, 1842 from East India and its occurrence in copal is also doubtful. Therefore, it is not included in the current list of fossil Zopheridae (Table 1).
Few extant species of Zopherinae (Zopheridae) were recorded from Quaternary deposits: *Phloeodes diabolicus* (Le Conte, 1851) and *Phloeodes plicatus* (Le Conte, 1859) from lithified tar in California, USA (0.3-0.012 Ma) (Pierce

1954, as *Nosoderma*; Doyen & Miller 1980), and *Pycnomerus terebrans* (Olivier, 1790) from carbonaceous sandstone in the United Kingdom (0.78–0.126 Ma) (Green *et al*. 2006).

Ecology and zoogeography of extant genera with newly described species. The genus *Xylolaemus* L. Redtenbacher, 1857 includes six extant described species (Alekseev & Lord 2014) and is distributed in the Old World: *X. fasciculosus* (Gyllenhal, 1827) from Europe (Austria, France, Italy, Romania, Sweden, southern Russia, Serbia), and northern Africa (Morocco, Tunisia); *X. indicus* Grouvelle, 1903 from northern India (Dardjiling); *X. griveaudi* Dajoz, 1980 from Madagascar; *X. africanus* Grouvelle, 1908 from eastern Africa (Burundi, Rwanda, Tanzania); *X. abnormis* Slipinski, 1984 from Saudi Arabia; and *X. aeonii* (Oromí & García, 1986) from Tenerife (Canary Islands). One fossil species (*X. sakhnovi* Alekseev & Lord, 2014) was described from Baltic amber. The European species *X. fasciculosus* occurs under loose bark of old deciduous trees (*Fagus*, *Quercus*, *Acer*).

Four extant West Palaearctic species are included in the genus *Diodesma* Latreille, 1829 (Ślipiński & Schuh 2008): *D. denticinta* Abeille de Perrin, 1899 [France, Italy], *D. besucheti* Dajoz, 1977 [Morocco], *D. parallela* Reitter, 1922 [Algeria and Morocco], and *D. subterranea* Latreille, 1829 [southern, central and eastern Europe: Austria, Bosnia, Czech Republic, France, Germany, Hungary, Italy, Poland, Slovakia, Slovenia, Switzerland, Ukraine, Serbia.]. *D. subterranea* is associated with the dead, moist twigs of *Fagus* and *Quercus* found lying on ground, occurs under loose bark and on fruiting bodies of wood-rotting fungi, and can also be found on fresh cut pine twigs.

The genus *Endophloeus* Dejean, 1834 includes six extant species (Reitter 1877; Reitter 1882; Sharp 1885; Brèthes 1925; Blackwelder 1945; Elgueta & Arriagada 1989; Ślipiński & Schuh 2008): four of them are distributed in the Palaearctic (*E. markovichianus* (Piller & Mitterpacher, 1783); *E. exsculptus* Germar, 1847; *E. serratus* Sharp, 1885; *E. squarrosus* Germar, 1847), and two species are known from Chile, South America (*E. porteri* Brethes, 1925; *E. sharpi* Reitter, 1877). The representatives of this genus are associated with saproxylic habitats: the most widely distributed and comparatively better-studied *E. markovichianus* occurs under lichens, moss and loose bark on deciduous (mostly fagacean) trees.

Some ecological notes concerning beetles of Baltic amber have been presented earlier (Háva & Alekseev 2015; Bukejs *et al*. 2015; Alekseev & Alekseev 2016). New ideas are presented below. Many taxa of beetles are adapted to narrow environmental ranges making them indicators of climate and habitat quality. These restrictions should hold true for the beetles of the past and could be used for reconstructions of palaeoclimates. Recent representatives of the genera *Xylolaemus*, *Diodesma* and *Endophloeus* have a sporadic or restricted distribution in Eurasia, Africa and South America. They all occur rarely in Europe, are considered to be red-listed for different territories (Audisio *et al*. 2014; Pawłowski *et al.* 2002), and can be mostly found in mountain landscapes. However, the idea of the montane habitat requirement of these genera and consequently the mountain characteristics of the European Eocene amber forests, where the beetles lived, is likely superficial and wrong. These beetles are ecologically foremost "primeval forest relicts" (*i.e.* closely associated with the climax vegetation, *Fagus* and *Quercus* in the nemoral zone of Europe) and occur in natural old-growth forests. The present-day distribution of these beetles has been influenced by human activities within the last 2,000–3,000 years. All of these genera are evidently relicts of at least Eocene age and have survived primarily in southern (Mediterranean) Europe during the Quaternary glacial cycles. This assumption appears logical and is supported by the greater species diversity in these areas. Mountain landscape with associated old-growth deciduous trees became important for these genera only during the latest Holocene. The proportion of beech and oak forests in the current forest cover of Europe has been dramatically reduced through millennia of land use. Untouched, old-growth forests mostly remain only in small patches in a very few inaccessible (mountain) areas. Therefore, the biota of natural forests in the 19th and especially the 20th to 21st centuries has a seemingly montane distribution only because of widespread lowland deforestation. Similar controls on distribution could be a factor for the dendrophilous beetles inhabiting the present-day tropical and subtropical zones (Asia, Africa), where the natural vegetation mostly remains in mountain areas too. It is possible that this pattern should be taken into account during the determination of palaeoenvironments for aquatic insects too. Superficially similar natural montane or submontane relict distributions are peculiar to the ancient primitive groups (e.g. Agyrtidae, some genera of Carabidae (Schawaller 1983; Schmidt & Faille 2015; Schmidt *et al*. 2016)), but the reasons in the case of dendrophilous and arboreal fauna do not appear to be natural displacements by better-adapted groups. The present-day distributions of many dendrophilous taxa associated with old-growth forests is likely not the result of Paleogene (Eocene-Oligocene) climatic cooling or glaciations in Quaternary, but instead primarily from the agricultural activity of humans in the last millennium.

TABLE 1. Checklist of fossil Zopheridae.

Taxon	References	Fossil Type	Locality	Age
Zopheridae	Perkovsky *et al*. 2010	Rovno amber	Klesov, Ukraine	37.2–33.9 Ma
Colydiinae	Rasnitsyn & Ross 2000	Burmese amber	Myanmar/Burma	100.5–93.9 Ma
Colydiinae	Klebs 1910; Handlirsch 1925; Brues 1933; Bachofen-Echt 1949; Weidner 1952; Abdullah 1964; Larsson 1965; Kulicka & Ślipiński 1996; Kubisz 2001; Weitschat & Wichard 2002	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Bitoma glaesisepulta	Alekseev 2015	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Bitoma sp.	Kubisz 2000	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Cicones sp.	Helm 1896; Handlirsch 1908; Spahr 1981	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Colydium sp.	Berendt 1845; Giebel 1852, 1856a, 1856b; Scudder 1885, 1886, 1891; Handlirsch 1908; Klebs 1910; Larsson 1978; Spahr 1981; Kubisz 2000	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Coxelus sp.	Klebs 1910; Bachofen-Echt 1949; Abdullah 1964; Larsson 1978; Spahr 1981	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Diodesma slipinskii	present paper	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Diodesma sp.	Klebs 1910; Bachofen-Echt 1949; Abdullah 1964; Larsson 1978; Spahr 1981	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Endophloeus gorskii	present paper	Baltic amber	Gdansk, Poland	37.2–33.9 Ma
Endophloeus sp.	Helm 1896; Handlirsch 1908; Klebs 1910; Abdullah 1964; Larsson 1978; Spahr 1981	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Eucicones oblongopunctata	Wickham 1913 (as *Cicones*); Wickham 1920	lacustrine shale	Florissant, Colorado (USA)	37.2–33.9 Ma
Namunaria sp.	Hopkins et al. 1971	Unlithified alluvial sandstone	Alaska (USA)	7.2–5.3 Ma
Phloeonemites miocenus	Wickham 1912	lacustrine shale	Florissant, Colorado (USA)	37.2–33.9 Ma
Rhagoderidea striata	Wickham 1914	lacustrine shale	Florissant, Colorado (USA)	37.2–33.9 Ma
Rhopalocerus sp.	Klebs 1910 (*Apistus*); Bachofen-Echt 1949; Abdullah 1964; Larsson 1978; Spahr 1981	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Synchita sp.	Klebs 1910; Bachofen-Echt 1949; Abdullah 1964; Larsson 1978; Spahr 1981	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Xylolaemus legalovi	present paper	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Xylolaemus richardklebsi	present paper	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Xylolaemus sakhnovi	Alekseev & Lord 2014	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Xylolaemus sp.	Klebs 1910; Bachofen-Echt 1949; Abdullah 1964; Larson 1978; Spahr 1981	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Synchitini	Kirejtshuk & Nel 2013	Oise amber	Oise department, France	55.8–48.6 Ma
Synchitini	Hieke & Pietrzeniuk 1984 (Diodesmini); present paper	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Zopherinae				
Pycnomerini	Tröster 1993	claystone	Messel pit, Hesse, Germany	47.8–41.3 Ma
Pycnomerus simukovi	Alekseev 2015; present paper	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma
Pycnomerus sp.	present paper	Baltic amber	Kaliningrad region (Russia)	37.2–33.9 Ma

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References

Abdullah, M. (1964) New heteromerous beetles (Coleoptera) from the Baltic amber of eastern Prussia and gum copal of Zanzibar. *Transactions of the Royal Entomological Society of London*, 116, 329–346.
http://dx.doi.org/10.1111/j.1365-2311.1964.tb02300.x

Alekseev, V.I. (2013) The beetles (Insecta: Coleoptera) of Baltic amber: the checklist of described species and preliminary analysis of biodiversity. *Zoology and Ecology*, 23 (1), 5–12.
http://dx.doi.org/10.1080/21658005.2013.769717

Alekseev, V.I. (2015) New cylindrical bark and ironclad beetles (Coleoptera: Zopheridae) from Baltic amber. *Baltic Journal of Coleopterology,* 15 (1), 17–24.

Alekseev, V.I. & Alekseev, P.I. (2016) New approaches for reconstruction of the ecosystem of an Eocene amber forest. *Biology Bulletin*, 43 (1), 75–86.
http://dx.doi.org/10.1134/s1062359016010027

Alekseev, V.I. & Bukejs, A. (2015) A new species of the genus *Orchesia* Latreille (Coleoptera: Melandryidae) from Baltic amber with a key to species described from fossil resins. *Zootaxa*, 3947 (4), 590–596.
http://dx.doi.org/10.11646/zootaxa.3947.4.10

Alekseev, V.I. & Grzymala, T.L. (2015) New Aderidae (Coleoptera: Tenebrionoidea) from Baltic and Bitterfeld amber. *Zootaxa,* 3956 (2), 239–257.
http://dx.doi.org/10.11646/zootaxa.3956.2.5

Alekseev, V.I. & Lord, N.P. (2014) A new species of *Xylolaemus* (Coleoptera: Zopheridae: Colydiinae) from Baltic amber. *Baltic Journal of Coleopterology,* 14 (1), 97–102.

Alekseev, V.I. & Nabozhenko, M.V. (2015) A new fossil tenebrionid beetle of the tribe Palorini from Eocene Baltic amber. *Coleopterologists Bulletin*, 14, 127–130.
http://dx.doi.org/10.1649/0010-065X-69.mo4.127

Alekseev, V.I. & Telnov, D. (2016). First fossil record of Ischaliidae Blair, 1920 (Coleoptera) from Eocene Baltic amber. *Zootaxa*, 4109 (5), 595–599.
http://dx.doi.org/10.11646/zootaxa.4109.5.8

Audisio, P., Baviera, C., Carpaneto, G.M., Biscaccianti, A.B., Battistoni, A., Teofili, C. & Rondinini, C. (2014) *Lista Rossa IUCN dei Coleotteri saproxilici Italiani.* Comitato Italiano IUCN e Ministero dell'Ambiente e della Tutela del Territorio e del Mare, Roma, 132 pp.

Bachofen-Echt, A. (1949) *Der Bernstein und seine Einschlüsse*. Wien, Springer, 204 pp.
http://dx.doi.org/10.1007/978-3-7091-2303-4

Berendt, G. (1845) *Die im Bernstein befindlichen organischen Reste der Vorwelt gesammelt in Verbindung mit mehreren bearbeitet. Erster Band. Abtheilung I. Der Bernstein und die in ihm befindlichen Pflanzenreste der Vorwelt.* Nikolaische Buchhandlung, Danzig, 125 pp.

Blackwelder, R.E. (1945) Checklist of the coleopterous insects of México, Central America, the West Indies, and South America. Part 3. *Bulletin U.S. National Museum*, 185, i–iv, 343–550.
http://dx.doi.org/10.5479/si.03629236.185.3

Bouchard, P., Bousquet, Y., Davies, A.E., Alonso-Zarazaga, M.A., Lawrence, J.F., Lyal, C.H.C., Newton, A.F., Reid, C.A.M., Schmitt, M. & Ślipiński, A. (2011) Family-group names in Coleoptera (Insecta). *ZooKeys*, 88, 1–972.
http://dx.doi.org/10.3897/zookeys.88.807

Brèthes, J. (1925) Coléoptères et Diptères Chiliens. *Revista Chilena de Historia Natural*, 29, 198–208.

Brues, C.T. (1933) Progressive change in the insect population of forests since the Early Tertiary. *The American Naturalist*, 67, 385–406.
http://dx.doi.org/10.1086/280501

Bukejs, A. & Alekseev, V.I. (2015a) A second Eocene species of death-watch beetle belonging to the genus *Microbregma* Seidlitz (Coleoptera: Bostrichoidea) with a checklist of fossil Ptinidae. *Zootaxa*, 3947 (4), 553–562.
http://dx.doi.org/10.11646/zootaxa.3947.4.6

Bukejs, A. & Alekseev, V.I. (2015b) Description of the second fossil Baltic amber species of Monotomidae (Coleoptera: Cucujoidea). *Zootaxa*, 3946 (3), 445–450.
http://dx.doi.org/10.11646/zootaxa.3946.3.11
Bukejs, A., Alekseev, V.I. & Jäch, M.A. (2015) The riffle beetles (Coleoptera: Elmidae) of the Eocene Baltic amber: *Heterelmis groehni* sp. nov. and *Heterlimnius samlandicus* (Bollow, 1940) comb. nov. *Zootaxa*, 3986 (4), 452–460.
http://dx.doi.org/10.11646/zootaxa.3986.4.4
Bukejs, A. & Kirejtshuk, A.G. (2015) A new species of the genus *Smicrips* Le Conte (Coleoptera: Smicripidae) from Baltic amber. *Paleontological Journal*, 49 (13), 1417–1419.
http://dx.doi.org/10.1134/S003103011513002X
Bukejs, A. & Nadein, K. (2015) First fossil Lamprosomatinae leaf beetles (Coleoptera: Chrysomelidae) with descriptions of new genera and species from Baltic amber. *Zootaxa,* 3931 (1), 127–139.
http://dx.doi.org/10.11646/zootaxa.3931.1.9
Doyen, J.T. & Miller, S.E. (1980) Review of Pleistocene darkling ground beetles of the California asphalt deposits (Coleoptera: Tenebrionidae, Zopheridae). *The Pan-Pacific Entomologist*, 56, 1–10.
Freude, H. (1952) Die Lösung des Rätsels um *Monomma resinorum* Hope. *Mitteilungen der Münchner Entomologischen Gesellschaft*, 42 (1), 111–116.
Elgueta, M.D. & Arriagada, G.S. (1989) Estado actual del conocimeento de los coleopteros de Chile (Insecta: Coleoptera). *Revista Chilena de Entomología*, 17, 5–60.
Gamboa, S. & Ortuño, V.M. (2015) A new fossil species of the genus *Coptodera* Dejean, 1825 (Coleoptera: Carabidae: Lebiinae) from Baltic amber. *Zootaxa,* 3981 (4), 592–596.
http://dx.doi.org/10.11646/zootaxa.3981.4.9
Giebel, C.G.A. (1852) *Deutschlands Petrefacten. Ein systematisches Verzeichnis aller in Deutschland und den angrenzenden Ländern vorkommenden Petrefacten nebst Angabe der Synonymen und Fundorte*. Leipzig, Abel, XIII + 706 pp.
Giebel, C.G.A. (1856a) *Fauna der Vorwelt mit steter Berücksichtigung der lebenden Thiere. Gliederthiere. Zweite Band: Insecten und Spinnen*. Leipzig, F.A. Brockhaus, XVII + 511 pp.
Giebel, C.G.A. (1856b) Geologische Übersicht der vorweltlichen Insecten. *Zeitschrift für die gesammten Naturwissenschaften*, 8, 174–188.
Green, C.P., Branch, N.P., Coope, G.R., Field, M.H., Keen, D.H., Wells, J.M., Schwenninger, J.L., Preece, R.C., Schreve, D.C., Canti, M.G. & Gleed-Owen, C.P. (2006) Marine Isotope Stage 9 environments of fluvial deposits at Hackney, north London, UK. *Quaternary Science Reviews*, 25, 89–113.
http://dx.doi.org/10.1016/j.quascirev.2004.10.011
Handlirsch, A. (1908) *Die fossilen Insekten und die Phylogenie der rezenten Formen. Ein Handbuch für Paläontologen und Zoologen*. Wilhelm Engelmann, Leipzig, IX + 1430 pp.
Handlirsch, A. (1925) Paläontologie. *In*: Schröder, C.W.M. (Ed.), *Handbuch der Entomologie, Volume 3*. Gustav Fischer, Jena, Germany, pp. 117–306.
Háva, J. & Alekseev, V.I. (2015) Contribution to the palaeofauna of Dermestidae (Coleoptera) from Baltic and Bitterfeld ambers. *Zoology and Ecology*, 25 (2), 154–156.
http://dx.doi.org/10.1080/21658005.2015.1025618
Háva, J. & Damgaard, A.L. (2015) A new species of Globicornis (Hadrotoma) (Coleoptera, Dermestidae, Megatominae) from Baltic amber. *Vestnik zoologii*, 49 (4), 373–376.
Helm, O. (1896) Beiträge zur Kenntniss der Insecten des Bernsteins. *Schriften der Naturforschenden Gesellschaft in Danzig* (Anlage C.) N.S., 9, 220–231.
http://dx.doi.org/10.1016/0031-0182(71)90032-0
Hieke, F. & Pietrzeniuk, E. (1984) Die Bernstein-Käfer des Museums für Naturkunde, Berlin (Insecta, Coleoptera). *Mitteilungen aus dem Zoologischen Museum Berlin*, 60, 297–326.
Hoffeins, H.W. (2001) On the preparation and conservation of amber inclusions in artificial resin. *Polish Journal of Entomology*, 70, 215–219.
Hope, F.W. (1842) Description de quelques insectes non decrits trouves dans la resine anime. *Magasin de Zoologie, d'Anatomie comparée et Palaeontologie*, 2 série, 4, 3 pp. [without pagination], + 3 Plates [87–89].
Hopkins, D.M., Matthews, J.V., Wolfe, J.A. & Silberman, M.L. (1971) A Pliocene flora and insect fauna from the Bering Strait Region. *Paleogeography, Palaeoclimatology, Palaeoecology*, 9 (3), 211–231.
Jałoszyński, P. & Kubisz, D. (2016) First records of Chevrolatiini and Cephenniini in Eocene Baltic amber (Coleoptera, Staphylinidae, Scydmaeninae). *Zootaxa*, 4114 (5), 572–580.
http://dx.doi.org/10.11646/zootaxa.4114.5.3
Kirejtshuk, A.G. & Nel, A. (2013) Current knowledge of Coleoptera (Insecta) from the Lowermost Eocene Oise amber. *Insect Systematics & Evolution*, 44, 175–201.
http://dx.doi.org/10.1163/1876312X-04402007
Klebs, R. (1910) Über Bernsteineinschlüsse in allgemeinen und die Coleopteren meiner Bernsteinsammlung. *Schriften der Physikalisch-ökonomischen Gesellschaft zu Königsberg*, 51, 217–242.
Kubisz, D. (2000) Fossil beetles (Coleoptera) from Baltic amber in the collection of the Museum of Natural History of ISEA in Krakow. *Polish Journal of Entomology*, 69, 225–230.

Kubisz, D. (2001) Beetles in the collection of the Museum of Amber Inclusions, University of Gdansk, with description of *Colotes sambicus* sp. n. (Coleoptera: Melyridae). *Polish Journal of Entomology*, 70, 259–265.
Kulicka, R. & Ślipiński, S.A. (1996) A review of the Coleoptera inclusions in the Baltic amber. *Prace Muzeum Ziemi*, 44, 5–11.
Larsson, S.G. (1965) Reflections on the Baltic amber inclusions. *Entomologiske Meddelelser*, 34, 135–142.
Larsson, S.G. (1978) *Baltic amber – a palaeobiological study. Volume 1.* Scandinavian Science Press Ltd., Klampenborg, Denmark, 192 pp.
Legalov, A.A. & Bukejs, A. (2015) A new species of the genus *Archaeocallirhopalus* Legalov (Coleoptera: Curculionidae: Entiminae) in Baltic amber. *Entomologica Fennica*, 26, 25–29.
Pawłowski, J., Kubisz, D. & Mazur, M. (2002) Coleoptera Chrząszcze. *In*: Głowaciński, Z. (Ed.), *Czerwona lista zwierząt ginących i zagrożonych w Polsce*. Instytut Ochrony Przyrody, PAN, Kraków, pp. 88–110.
http://dx.doi.org/10.5962/bhl.part.117735
Perkovsky, E.E., Zosimovich, V.Yu. & Vlaskin, A.P. (2010) Rovno amber. *In*: Penney, D. (Ed.), *Biodiversity of Fossils in Amber from the major World Deposits*. Siri Scientific Press, pp. 117–173.
Pierce, W.D. (1954) Fossil arthropods of California no. 18. The Tenebrionidae-Tentyriinae of the asphalt deposits. *Bulletin of the Southern California Academy of Sciences*, 53, 35–45.
Rasnitzyn, A.P. & Ross, A.J. (2000) A preliminary list of arthropod families present in the Burmese amber collection at The Natural History Museum, London. *Bulletin of the Natural History Museum, Geology Series*, 56 (1), 21–24.
Reitter, E. (1877) Beitrag zur Kenntnis der Colydier. *Entomologische Zeitung (Stettin)*, 38, 323–356.
Reitter, E. (1882) Bestimmungs-Tabellen der europāischen Coleopteren. VI. Enhaltend die Familien: Colydiidae, Rhysodidae, Trogositidae. *Verhandlungen des Naturforschenden Vereines in Brünn*, 22 [1881], 113–149.
Schawaller, W. (1983) Die Arten der Gattung *Ipelates* (sensu lato) (Coleoptera, Silphidae, Agyrtinae). *Revue Suisse de Zoologie,* 90, 101–110.
Schmidt, J. & Faille, A. (2015) Confirmation of occurrence of *Trechus* Clairville, 1806 in the Baltic amber forests, with description of a flightless edaphic species, and remarks on *Trechoides* Motschulsky, 1856 (Coleoptera: Carabidae: Trechini). *Zootaxa*, 4028 (4), 539–550.
http://dx.doi.org/10.11646/zootaxa.4028.4.5
Schmidt, J., Hoffmann, H. & Michalik, P. (2016) Blind life in the Baltic amber forests: description of an eyeless species of the ground beetle genus Trechus Clairville, 1806 (Coleoptera: Carabidae: Trechini). *Zootaxa*, 4083 (3), 431–443.
http://dx.doi.org/10.11646/zootaxa.4083.3.7
Scudder, S.H. (1885) Insecta. Insekten. *In*: Zittel, K.A. (Ed.), *Handbuch der Palaeontologie*, *I Abtheilung. Palaeozoologie, II Band. Mollusca und Arthropoda.* München & Leipzig, Oldenbourg, 747–831.
Scudder, S.H. (1886) Systematic review of our present knowledge of fossil insects, including Myriapods and Arachnids. *Bulletin of the United States Geological Survey*, 31, 1–128.
Scudder, S.H. (1891) Index to the known fossil insects of the world including Myriapods and Arachnids. *Bulletin of the United States Geological Survey*, 71, 1–744.
Sharp, D. (1885) On the Colydiidae collected by Mr. G. Lewis in Japan. *The Journal of the Linnean Society. Zoology*, 19, 58–84.
http://dx.doi.org/10.1111/j.1096-3642.1885.tb02050.x
Spahr, U. (1981) Systematischer Katalog der Bernstein und Kopalkäfer (Coleoptera). *Stuttgarter Beiträge zur Naturkunde, Serie B (Geologie und Paläontologie)*, 80, 1–107.
Ślipiński, S.A. & Schuh, R. (2008) Zopheridae. *In*: Löbl, I. & Smetana, A. (Eds.), *Catalogue of Palaearctic Coleoptera, Vol. 5*. Stenstrup, Apollo Books, pp. 78–87.
Tröster, G. (1993) Wasserkäfer und andere Raritäten – Neue Coleoptera-Funde aus dem mitteleozänen Tonstein der Grube Messel bei Darmstadt. *Kaupia*, 2, 145–154.
Vitali, F. (2015) *Mesalocerus tetropoides* n. gen., n. sp. from Baltic amber: the first fossil member of the tribe Anisarthrini Mamaev & Danilevsky, 1973 (Coleoptera, Cerambycidae). *Les Cahiers Magellanes, NS*, 18, 69–73.
Weidner, H. (1952) Insektenleben im Bernsteinwald. (Ein Bericht über die Bemsteinsammlung des geologischen Staatsinstitutes Hamburg). *Entomologische Zeitschrift*, 62 (8–9), 62–72.
Weitschat, W. & Wichard, W. (2002) *Atlas of Plants and Animals in Baltic Amber*. München, Pfeil, 256 pp.
Wickham, H.F. (1912) A report of some recent collections of fossil Coleoptera from the Miocene shales of Florissant. *Bulletin from the Laboratories of National History of the State University of Iowa*, 6 (3), 3–38.
Wickham, H.F. (1913) Fossils Coleoptera from the Wilson ranch near Florissant, Colorado. *Bulletin from the Laboratories of National History of the State University of Iowa*, 6 (4), 3–29.
Wickham, H.F. (1914) New Miocene Coleoptera from Florissant. *Bulletin of the Museum of Comparative Zoology, Harvard College*, 53, 423–494.
Wickham, H.F. (1920) Catalogue of the North American Coleoptera described as fossils. *In*: Leng, C.W. (Ed.), *Catalogue of the Coleoptera of America North of Mexico.* John, D. Sherman Jr., Mount Vernon, N.Y., pp. 349–365.