



New fossil taxa of *Ischalia* Pascoe (Coleoptera: Ischaliidae) from Eocene Baltic amber

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Abstract

Two new fossil species of false fire-colored beetles (Coleoptera: Ischaliidae), *Ischalia dohnaturris* **sp. nov.** and *I. danieli* **sp. nov.**, are described and illustrated from Eocene Baltic amber. The fossil species *I. dohnaturris* **sp. nov.** is considered to be the first macropterous representative of the subgenus *Eupleurida* LeConte. The second species, *I. danieli* **sp. nov.**, is placed in the newly described subgenus *Telnovia* **subgen. nov.** The subgeneric characters of *Ischalia* are briefly discussed. A key to fossil species of *Ischalia* is also provided.

Key words: Ischaliidae, fossil resin, Paleogene, new subgenus, new species

Introduction

Ischaliidae Blair, 1920 contains 43 extant monogeneric species distributed in the Northern Hemisphere (Nearctic, Oriental and south-eastern Palaearctic regions) (Satô 1990, 2002a, 2002b; Nikitsky 1994; Saitô 1994, 2011; Satô & Ohbayashi 2001; Gusakov & Telnov 2007; Young 2008, 2011, 2014; Kazantsev & Young 2010; Saitô & Young 2015). *Ischalia* Pascoe, 1860 is not native in present-day Europe, and it is composed of three extant subgenera (Young 2011): *Ischalia* s. str., *Eupleurida* LeConte, 1862, and *Nitidischalia* Young, 2011. To date, only one fossil ischaliid species, *Ischalia youngi*, has been described from Baltic amber, and this species was assigned to the nominate subgenus (Aleksseev & Telnov 2016).

In the present paper, two new fossil species of *Ischalia* are described from Baltic amber. One is tentatively placed in the subgenus *Eupleurida*, the other is assigned to a new subgenus. The known diversity of *Ischalia* from Eocene Baltic amber (representatives of three subgenera) is comparable with the recent world fauna.

Material and methods

Two specimens were examined during the current study. The holotypes are deposited in the following collections:

- Kaliningrad Amber Museum (Russia) [KAM];
- Geological-Palaeontological Institute of the University of Hamburg (Germany) [GPIH], as part of the collection of Carsten Gröhn.

The amber pieces examined were polished by hand, and faceted on their sides, allowing for improved views of the included specimens. Measurements were taken using an ocular micrometer, and are expressed in millimeters. Reconstructions were based on free-hand drawings made during examination of the original specimens. Figures were edited using Adobe Photoshop CS8 software.

Photographs of specimen from KAM were taken using a MC-2 ZOOM stereomicroscope equipped with a

Toup Cam 10 MP digital camera. Photographs of specimen from GPIH were taken using a Nikon SMZ 745T stereomicroscope equipped with a Nikon DS-Fi1 digital camera. Extended depth of field at high magnifications was achieved by combining multiple images from a range of focal planes using Helicon Focus software.

Systematic Palaeontology

Family Ischaliidae Blair, 1920

Genus *Ischalia* Pascoe, 1860

Subgenus *Eupleurida* LeConte, 1862

Ischalia (Eupleurida) dohnaturris sp. nov.

(Figs 1–5)

Type material. Holotype No. 5584-34 [KAM], adult, male. Complete beetle with partially exposed aedeagus and metathoracic wings, included in small elongate yellow amber piece with approximate dimensions: $18 \times 11 \times 9$ mm. Venter of specimen partially obscured by “milky” amber opacity. Syninclusion represented by one stellate fagacean trichome.

Type strata. Baltic amber, mid-Eocene to Upper Eocene.

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

Etymology. The specific epithet is used as a composite noun in genitive case and refers to the place of the holotype deposition. The epithet is formed after the German “der Dohnaturm” [Latin “turris” for German “der Turm” (the tower)]. Der Dohnaturm was built as the part of the fortification system of the former East Prussian capital Königsberg in 1853 and now accommodates the Kaliningrad Amber Museum.

Diagnosis. Absence of humeral elytral carinae suggests placement of species in subgenus *Eupleurida* (in contrast with subgenera *Nitidischalia* Young, 2011 and *Ischalia* s.str., which have humeral carinae reduced or fully developed). Macropterous metathoracic wings (completely lacking in all known extant *Eupleurida* species) is considered a plesiomorphic character state and not as a subgenerically diagnostic feature. Similarity of habitus between newly described species and *Ischalia (Eupleurida) vancouverensis* Harrington, 1892 from western North America provides additional support for placement within *Ischalia (Eupleurida)*.

Ischalia (Eupleurida) dohnaturris sp. nov. differs from extant species of subgenus in possessing following combination of characters: (1) macropterous metathoracic wings, (2) very short median longitudinal pronotal carina, (3) comparatively slender antennae with broadened terminal antennomere, (4) long and narrow elytra, (5) posterior pronotal angles not protruding, (6) apparently monochromatic elytra. This new species can be readily distinguished from other fossil *Ischalia* representatives by its narrow body, elytral carinae, pronotal structure, and long pubescence on elytral base.

Description. Body length 4.2 mm, body maximum width 1.4 mm; pronotum 0.75 mm long, maximum width 0.9 mm; elytral length 3.25 mm, maximal combined width of elytra (postmedially) 1.4 mm. Head, palpi, thorax, and abdomen appear to have originally been orange or light brown; elytra and antennae preserved with darker colour, almost black. Dorsal surface sparsely covered with short, fine and recumbent setae; elytral base with sparse, long (about 3–4× as long as puncture diameter), thin, recumbent pubescence. Head, pronotum, and elytra shiny, densely covered with large punctures (each about 3× as diameter of one eye facet); elytral punctures large, round, dense, separated by distance 0.25–0.30× of one puncture diameter in basal and periscutellar area, and by 0.5–1.0× in apical one-third.

Head transverse, slightly convex, constricted posteriorly. Compound eyes large, with vertical diameter about 4× transverse diameter; eye surface slightly convex, strongly emarginate on inner margin; glabrous with coarse facets. Antennae 11-segmented, filiform, moderately long, extending to basal one-fifth of elytra, antennomeres 3–11 with fine pubescence, antennomere 11 flattened and dilated (widest). Relative length ratios of antennomeres 1–11: 12-10-12-12-12-12-12-12-10-15. Terminal maxillary palpomere bulbous and thickened, securiform with rounded angles; terminal labial palpomere triangular.



FIGURES 1–4. *Ischalia (Eupleurida) dohnaturris* sp. nov., holotype: 1–habitus, dorsal view; 2–habitus, ventro-lateral view; 3–left antenna; 4–apical part of aedeagus. Not reproduced to the same scale.

Pronotum slightly transverse, about 1.2× as wide as long, and distinctly narrower than elytral base; short median longitudinal carina present in posterior one-fifth of pronotal length, distinct as small triangular tubercle at posterior pronotal margin; with two wide, transverse, posterior impressions, and with widened longitudinal median impression in anterior half. Anterior pronotal margin rounded; lateral margins convex in anterior half and slightly concave posteriorly; basal margin slightly convex. Anterior pronotal angles broadly rounded; posterior angles nearly acute, slightly protruding. Scutellar shield large, triangular, almost as long as wide, impunctate.

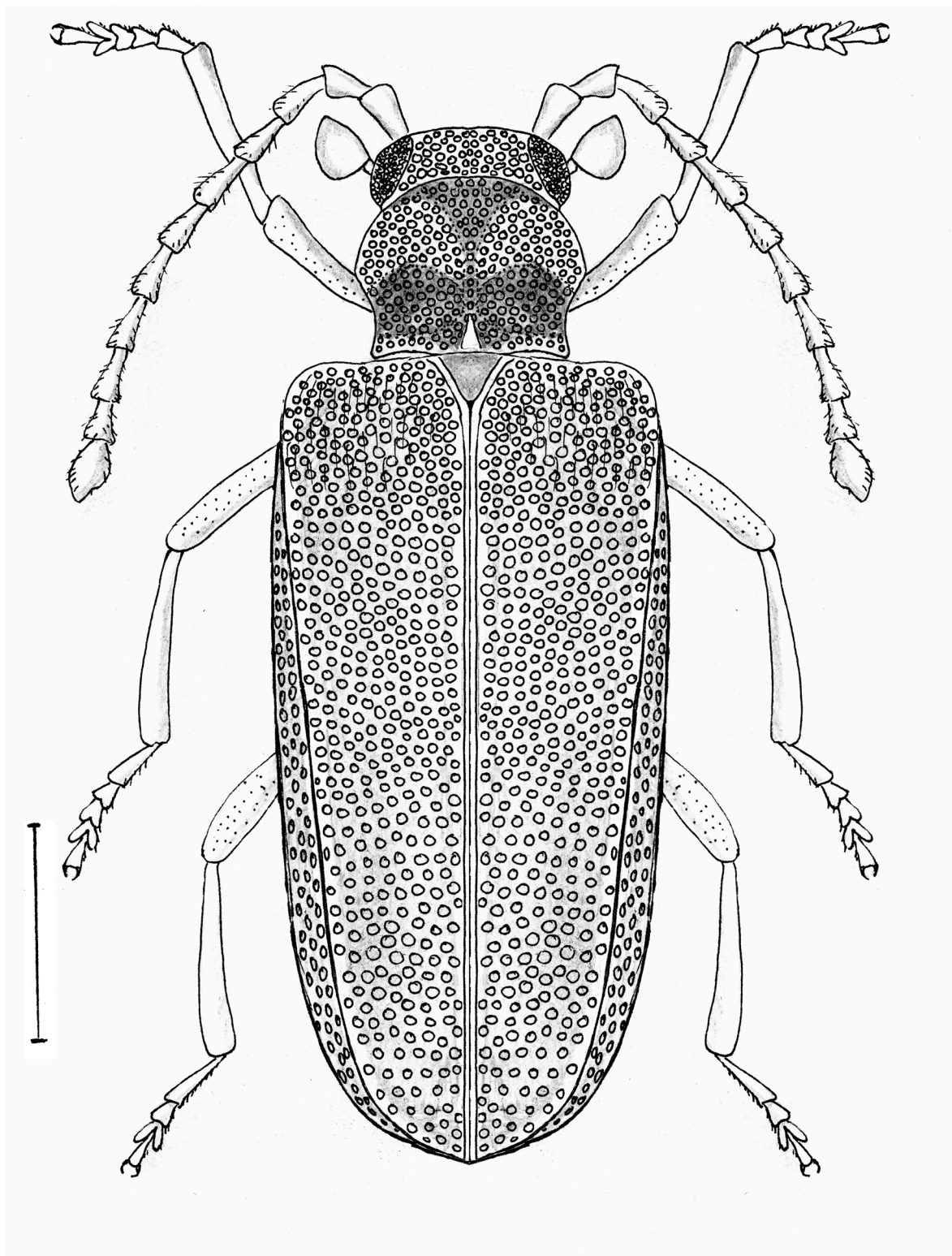


FIGURE 5. *Ischalia (Eupleurida) dohnaturris* sp. nov., reconstruction, dorsal view. Scale bar = 1 mm.

Elytra subparallel-sided, narrow and long (2.3× as long as combined width); irregularly punctate; completely covering abdomen; base slightly concave; humeral calli well-developed. Elytra with sutural, lateral discal, and lateral carinae complete; humeral carina absent. Epipleura well-developed, reaching apex of elytra. Metathoracic wings fully developed.

Abdomen with five freely articulated, visible ventrites of subequal length. Apical part of aedeagus visible (Fig. 4).

Legs moderately long and slender. Femora and tibiae subequal in length. Tibial spurs absent. Tarsal formula 5-5-4. All penultimate tarsomeres distinctly bilobate. Metathoracic tarsomere 1 slightly shorter than metathoracic tarsomeres 2–4 combined. Claws simple, acute, narrow, and symmetrical.

Note. Mesepisterna and mesosternal ventrite are not visible in examined specimen.

Subgenus *Telnovia* subgen. nov.

Type species: *Ischalia (Telnovia) danieli* sp. nov.

Diagnosis. *Telnovia* subgen. nov. differs from all subgenera of *Ischalia* in presence of discal elytral carinae (structure known in this fossil only). Each discal carina is situated approximately in middle of elytral disc, and distinct in the basal one-fourth of elytral length; it is obviously distant from the humeral and sutural aspects. Like some representatives of nominate subgenus, *Telnovia* subgen. nov. has the mesepisternae widely separated by the mesosternal ventrite (in contrast to subgenus *Eupleurida*), but it lacks humeral carinae (q.v. *Eupleurida*). *Telnovia* subgen. nov. can be distinguished from *Nitidischalia* by absence of shortened humeral carina, pronotum with shorter median longitudinal carina, conspicuously pubescent pronotum and elytra, and presence of pronotal depressions.

Etymology. This subgenus is patronymic, named after our colleague Dmitry Telnov (the Entomological Society of Latvia, Rīga, Latvia), in honor of his contributions to the study of Anthicidae and Ischaliidae. The gender is feminine.

Composition. The new subgenus is monotypic, represented by the type species only. Therefore, the subgeneric description considerably overlaps that of the species.

***Ischalia (Telnovia) danieli* sp. nov.**

(Figs 6–12)

Type material. Holotype No. C 2490 [GPIH], adult, male. Complete beetle included in small and thin amber piece with approximate dimensions: 22 × 10 × 4 mm. Syninclusions are represented by one stellate fagacean trichome and few small gas vesicles.

Type strata. Baltic amber, mid-Eocene to Upper Eocene.

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

Etymology. Patronymic, the specific epithet is dedicated to the son of the second author – Daniel Bukejs.

Diagnosis. As stated for the new subgenus. Additionally, *I. (Telnovia) danieli* sp. nov. differs from the similar looking fossil *I. (Eupleurida) dohnaturris* sp. nov. due to its wider habitus, short apical spur on mesothoracic and metathoracic tibiae, absence of long recumbent pubescence on anterior portions of elytra, shorter median longitudinal carina, and subtrapezoidal scutellar shield.

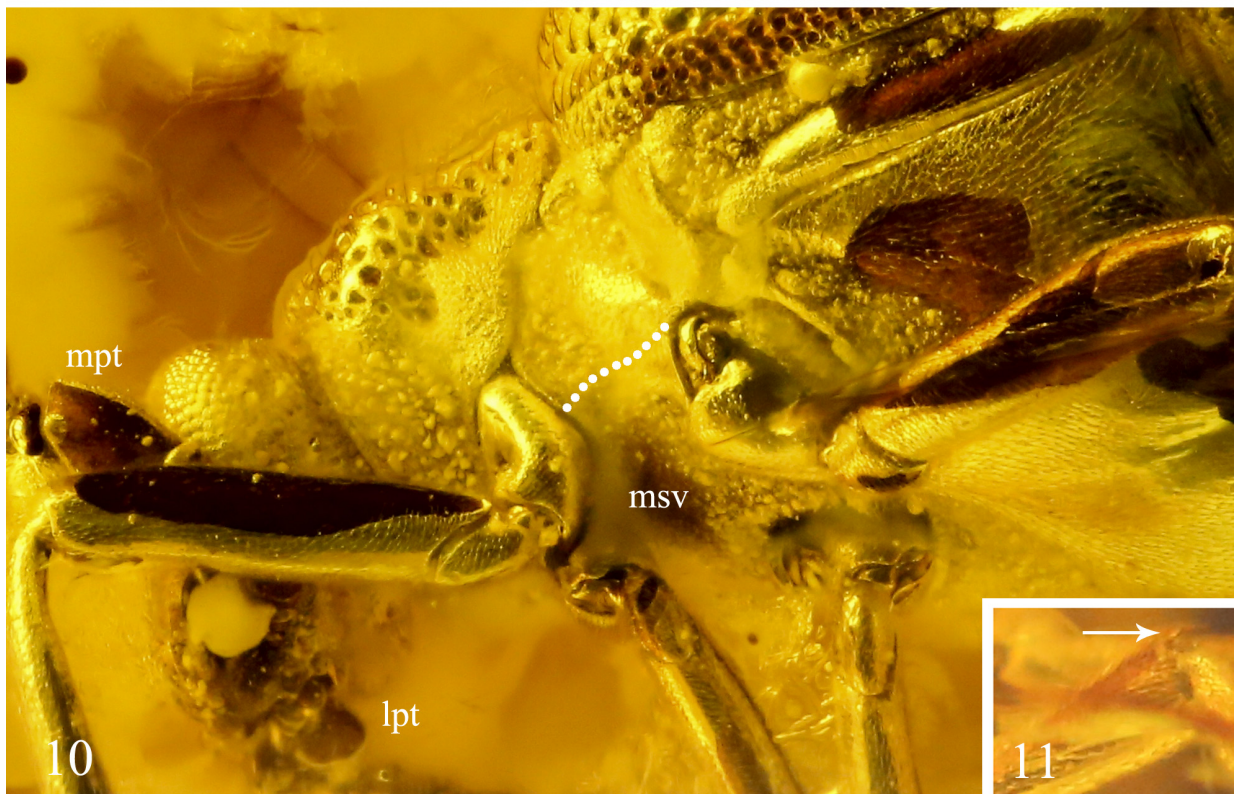
Description. Body length 5.6 mm; maximum body width 2.5 mm; pronotum 0.9 mm long, maximum width 1.2 mm; elytral length 4.3 mm; maximum combined width of elytra (postmedially) 2.5 mm. Body color dark brown; ventral surface, tarsi, palpi, and apical antennomeres apparently lighter in colour. Head, pronotum and elytra sparsely covered with short (about 2× as long as one puncture diameter), semi-erect setae; ventral surface and legs with finer, short, recumbent setae, in denser arrangement than setae on dorsal surface. Head, pronotum and elytra shiny, densely covered with large punctures (2–4× diameter of one eye facet), distance between punctures smaller than diameter of one puncture; pro-, meso-, metasternum, and abdomen with fine and dense punctation.

Head transverse, about 2.4× as wide as long, constricted posteriorly; frons slightly convex, inflated at antennal insertions. Compound eyes large, with vertical diameter about 2.2× transverse diameter, slightly convex, reniform; distinctly emarginate on inner margin; glabrous with coarse facets. Antennae 11-segmented, filiform, robust and moderately long, extending to basal one-fourth of elytra, densely pubescent (scape and pedicel with less conspicuous pubescence); scape subcylindrical, 1.6× as long as wide; pedicel nearly quadratic, 1.1× as long as wide, and 0.8× as long as scape; antennomeres 3–10 slightly dilated apically; antennomere 11 tapered, with pointed apex. Relative length ratios of antennomeres 1–11: 14-8-12-10-10-10-10-10-8-8-10. Clypeus transverse,

rectangular, almost flat; frontoclypeal suture distinct. Maxillary palpus 4-segmented; apical palpomere large, securiform, elongate, about 1.8× as long as wide. Labial palpus 3-segmented, short; apical palpomere distinctly transverse, 1.8× as wide as long, about as long as palpomeres 1–2 combined.



FIGURES 6–8. *Ischalia (Telnovia) danieli* sp. nov., holotype: 6–habitus, dorso-lateral view; 7–habitus, lateral view; 8–habitus, ventro-lateral view. Scale bar = 1 mm.



FIGURES 9–11. *Ischalia (Telnovia) danieli* sp. nov., holotype: 9–details of forebody, dorsal view; 10–details of forebody, ventro-lateral view (for better visualization, the outline of lateral margin of mesosternal ventrite is indicated by a dotted line); 11–apex of metatibia, arrow points to apical spur. Not reproduced to the same scale. Abbreviations: dc = discal carina, lpt = terminal labial palpomere, mpt = terminal maxillary palpomere, msv = mesosternal ventrite.

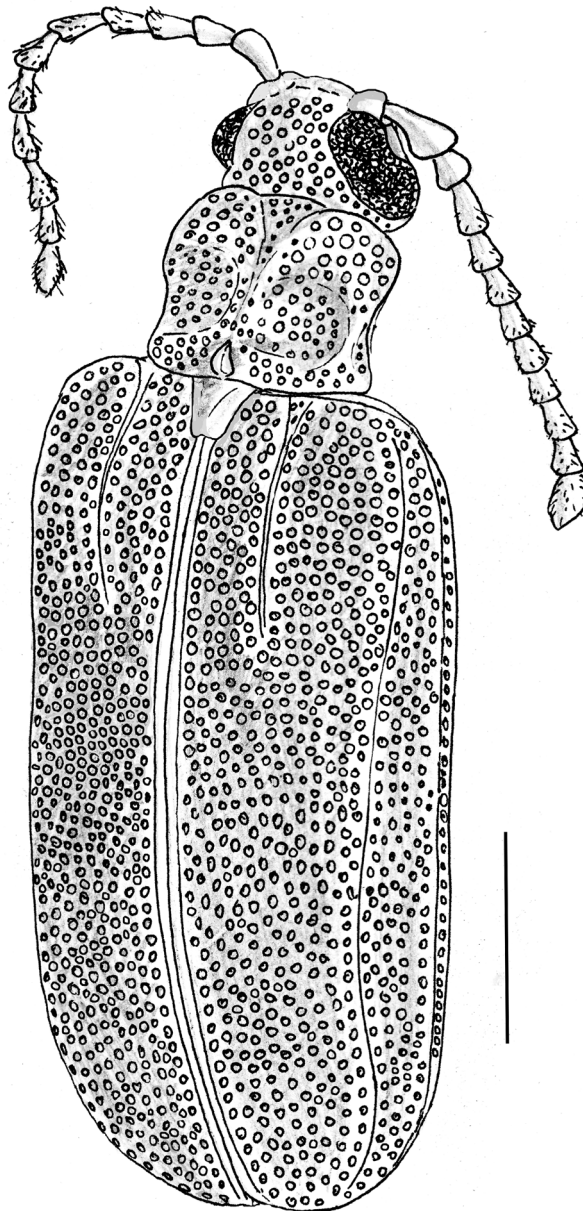


FIGURE 12. *Ischalia (Telnovia) danieli* sp. nov., reconstruction, dorso-lateral view. Scale bar = 1 mm.

Pronotum slightly transverse, about 1.3× as wide as long, distinctly narrower than anterior part of elytra; with short median longitudinal carina in posterior one-sixth of pronotal length and slightly produced posteriorly beyond margin; with two transverse, semicircular impressions in posterior half, and with longitudinal median impression in anterior half. Anterior margin almost straight, shallowly emarginate mesally; lateral margins rounded in anterior half and almost straight posteriorly; posterior margin slightly convex. Anterior angles widely rounded; posterior angles nearly rectangular, vaguely protruding. Scutellar shield large, subtrapezoidal, about 1.5× as long as wide, impunctate, dull, densely covered with fine pubescence, apical margin shallowly emarginate medially.

Elytra subparallel-sided, relatively flat, elongate (1.7× as long as combined width), irregularly punctate, completely covering abdomen, with concave anterior margin; humeral calli well-developed, distinctly protruding. Elytra with sutural, discal, lateral discal, and lateral carinae; humeral carinae absent; sutural carinae slightly convex, complete; discal carinae short, distinct in basal one-fourth of elytral length; lateral discal carinae gradually curved toward sutural carinae, becoming obsolete and not fusing with sutural carinae; lateral carinae fine, indistinct, apparently complete. Epipleura well-developed, wide, reaching apex of elytra. Mesosternal ventrite flat, with wide, rounded anterior margin; mesepisternae widely separated by mesosternal ventrite. Disc of metasternal ventrite slightly convex; metepisterna with nearly straight lateral margins, about 4.8× as long as wide. Metathoracic wings are not visible in examined specimen.

Abdomen with five freely articulated, visible ventrites of subequal length. Abdominal sutures straight.

Legs moderately long and slender. All coxae transverse; prothoracic coxae apparently contiguous, meso- and metathoracic coxae narrowly separated. Femora and tibiae subequal in length. Tibiae slightly curved; mesothoracic and metathoracic tibiae with thin, short apical spur. Tarsal formula 5-5-4. All penultimate tarsomeres distinctly bilobed. Each metathoracic tarsus about 0.7× as long as metathoracic tibia, each metathoracic tarsomere 1 about as long as metathoracic tarsomeres 2–4 combined. Claws simple, narrow, and symmetrical.

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

1. Elytra with humeral, sutural, lateral discal, and lateral carinae; pronotal surface almost impunctate; median longitudinal pronotal carina longer, distinct in posterior half; body length approximately 5.7 mm *I.* (s.str.) *youngi* Alekseev & Telnov
- Elytra without humeral carinae; pronotum with large and dense punctures; median longitudinal pronotal carina shorter, distinct within only posterior one-fifth of pronotal length. 2
2. Each elytron with three carinae (sutural, lateral discal, and lateral); tibiae without spurs; body length approximately 4.2 mm. *I.* (*Eupleurida*) *dohnaturris* **sp. nov.**
- Each elytron with four carinae (sutural, discal, lateral discal, and lateral); tibiae with spurs; body length approximately 5.6 mm *I.* (*Telnovia*) *danieli* **sp. nov.**

Discussion

The reasons for assignment of two coeval specimens of similar habitus to different subgenera in the current paper should be clarified. The main subgeneric differences of *Ischalia* were considered by Young (2011) as the following: (1) degree of development of humeral carinae, (2) presence or absence metathoracic wings, (3) pronotal vestiture, and (4) pronotal pits and depressions. *Eupleurida* is defined by the following putative synapomorphies: (1) complete lack of humeral elytral carinae and (2) complete lack of metathoracic wings. However, the fossil *I. dohnaturris* **sp. nov.** can be confidently assigned to this subgenus despite having fully developed hind wings. Such a taxonomic treatment appears to be logical in this situation (i.e., a Paleogene representative of the group could exhibit primitive morphological characters), and it is an attempt to avoid description of new taxon on the basis of a single character rarely visible in amber specimens. In the case of the second new species, *I. danieli* **sp. nov.**, the description of a new subgenus for its accommodation was considered necessary because the specimen presents a well-defined and obviously unique character for the genus *Ischalia* (presence of a discal carina in the basal one-fourth of the elytral length). Based on features we have observed in the genus, it could be supposed that the elytral carination should be primary and relevant for subgeneric subdivision of *Ischalia*, while the metathoracic wings (which are developed to different degrees in extant species of the subgenus *Ischalia* s.str.) could play a subordinate role for the systematics of the group.

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