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A new species of *Serropalpus* Hellenius (Coleoptera: Melandryidae) from Rovno amber, with key to extinct species of the genus

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Based on a well-preserved specimen in Eocene Rovno amber, a new species *Serropalpus groehni* sp. nov. (Coleoptera: Melandryidae) is described and illustrated. The new species differs from extinct congeners in having longer metatibial spur, weakly notched apex of mesosternal process, discernible elytral furrows, and outer edges of meso- and metatibiae with 8–9 oblique rows of bristles. An updated key to fossil *Serropalpus* species, known from Baltic and Rovno ambers, is also provided.

Keywords: Serropalpini, palaeodiversity, Paleogene, Eocene, fossil resin

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INTRODUCTION

The many members of the melandryid tribe Serropalpini are known from all zoogeographical areas, including Australia and New Zealand. Only two extant genera from this tribe, *Serropalpus* Hellenius and *Enchodes* LeConte, exhibit a Holarctic distribution (Nikitsky & Pollock 2010), however at least two species currently placed within the genus *Serropalpus* are known from Chile (Moore 2015).

The fossil record of Serropalpini is scant and all described taxa have been reported exclusively as inclusions in fossil resins (Bukejs & Alekseev 2015). To date, only eight extinct species belonging to six genera of the tribe have been described (Seidlitz 1898; Nikitsky 2002; Alekseev 2014; Tihelka et al. 2019; Li et al., 2022): two taxa from mid-Cretaceous Burmese (Kachin) amber (*Homalenchodes jarzembowskii* Li et al., 2022 and *Longicrusa jaracimrmani* Tihelka et al. 2019), two taxa from Late Cretaceous amber of New Jersey (*Pseudocuphosis tristis* Nikitsky, 2002 and *Archaeoserropalpus cretaceus* Nikitsky, 2002), as well as four species from Eocene Baltic amber (*Abderina helmi* Seidlitz, 1898; *Serropalpus ingemmescus* Alekseev, 2014; *S. ryzhkovianus* Alekseev, 2014; and *S. vivax* Alekseev, 2014). One additional specimen of the genus *Serropalpus* Hellenius, identified as *S. ryzhkovianus* has been reported also from Rovno amber (Alekseev 2022).

In the current study, the illustrated description of a new Eocene Rovno amber false darkling beetles assigned to the extant genus *Serropalpus* Hellenius is presented.

MATERIAL AND METHODS

The material examined is deposited in the following collections:
- the collection of Carsten Gröhn (Glinde, Germany) [CCGG], separately deposited in the Center of Natural History (Centrum für Naturkunde – CeNak; formerly Geologisch-Paläontologisches Institut und Museum der Universität Hamburg), Hamburg, Germany [GPIH];
- the collection of Vitalii Alekseev (Kaliningrad, Russia) [CVIA].

The amber pieces were polished manually with emery papers of different grit sizes, allowing improved views of the included specimen, and were not subjected to any supplementary fixation.

The holotype of the new species was studied using a Nikon SMZ 745T stereomicroscope. The images were taken using a Canon 90D camera with an attached Canon MPE-65 mm macro lens. Extended depth of field at high magnifications was achieved by stacking multiple images from a range of focal planes using Helicon Focus v. 6.0.18 software, and the final images were edited to create figures using Adobe Photoshop 7.0. Measurements were made using an ocular micrometer in a stereomicroscope. The holotype of *Serropalpus ryzhkovianus* Alekseev, No AWI-036 [CVIA], was studied using a MBS-9 stereomicroscope. The photographs of the specimen were taken using a Canon EOS 4000D camera mounted on a Zeiss stereomicroscope.

The following references were used for the generic attribution and comparison with extinct taxa: Mank (1939), Nikitsky (1992), Pollock (2002), Nikitsky & Pollock (2010), Alekseev (2014), Alekseev & Bukejs (2021), and Li et al. (2022).

SYSTEMATIC PALEONTOLOGY

Family Melandryidae Leach, 1815
Subfamily Melandryinae Leach, 1815
Tribe Serropalpini Latreille, 1829
Genus *Serropalpus* Hellenius, 1786

Taxonomic assignment. The fossil under consideration shows the combination of characters corresponding to the subfamily Melandryinae within the family Melandryidae (tarsal formula 5-5-4; antennal insertions exposed from above; head capsule not abruptly constricted posteriorly; protarsal claws simple; procoxae posteriorly contiquous; tibial spurs serrate; pronotal disc without paired basal pits; eyes without interfacetal setae) and can be assigned to the tribe Serropalpini based on (1) vertical head position; (2) antennae long, not shorter than one-half of body length; (3) tibial spurs normal-sized; and (4) body strongly elongate, larger than 4 mm.

The studied inclusion is placed in the extant genus *Serropalpus* based on the combination of the following characters: (1) metatibial spurs normal-sized (i.e. less than 1/3 length of metatibia), but unequal in lenght; (2) antennomeres 5–10 elongate, filiform, slender; (3) posterior pronotal angles rectangular, not produced; (4) lateral pronotal carina present; (5) elytra subparallel-sided in anterior two-thirds, with shallow longitudinal furrows; (6) meso- and metatibiae with transverse rows of bristles on outer edge; (7) maxillary palpi strongly serrate with last maxillary palpomere elongate and cultriform; (8) penultimate metatarsomere simple, not lobed; (9) mesocoxae narrowly separated; and (10) prosternum before procoxal cavity short.

***Serropalpus groehni* sp. nov.**
(Figs 1–2, 3a)

Type material designated. Holotype: GPIH no. 5243, CCGG no. 8721 (ex coll. Jonas Damzen JDC-14006R); "Holotype / *Serropalpus groehni* sp. nov. / Bukejs A. & Alekseev V. des. 2025" [red printed label]; adult, sex unknown. A rather complete beetle (right antenna missing) with partially exposed metathoracic wings is included in a transparent, yellow amber piece with dimensions of 45×15 mm and a maximum thickness of 7 mm; preserved without supplementary fixation. Syninclusions: some stellate Fagaceae trichomes, few small gas vesicles, and numerous minute organic particles.

Stratum typicum. Rovno amber, late Eocene (Perkovsky et al. 2007).

Locus typicus. Rivne Oblast (region), Ukraine.

Description. Measurements: body length (from anterior margin of pronotum to elytral apex along midline) 4.3 mm, body maximum width across elytra 1.2 mm; pronotum length 0.8 mm, pronotum maximum width 1.1 mm; elytra length 3.5 mm, elytra maximum width 1.2 mm.

Body narrowly elongated, slightly convex dorsally and ventrally; integument unicolorrous dark brown (as preserved). Pubescence: dorsal surface densely covered with fine, homogeneous, recumbent setae; metaventrite with inconspicuous pubescence, abdomen with very fine, recumbent setation.

Head inflexed downwards, not visible in dorsal view, densely covered with fine punctation. Frons and vertex weakly convex. Labrum transverse, anterior margin rounded. Compound eyes large, slightly prominent, oval, vertical, inner margin weakly emarginated medially; facets rather large (distinctly larger than head punctures), without intrafacetal setae; interocular distance at upper margin of eyes nearly equal to vertical diameter of one eye. Antennal insertions exposed from above Antennae 11-segmented, filiform, not flattened, inserted between and close to inner margin of eyes, long, extending to about middle of elytra, pubescent; antennomere 1 subcylindrical, slightly dilated apically, elongate, long; antennomere 2 cylindrical, shortest, about 0.4× as long as antennomere 1, and about 0.5× as long as antennomere 3; antennameres 3–10 cylindrical, elongate, equal in length and shape; antennomere 11 cylindrical, pointed apically, slightly longer than antennomere 10. Maxillary palpi 4-segmented, long; palpomere 1 smallest, cylindrical, elongate, 1.7× as long as wide; palpomeres 2 and 3 subequal in length, triangular with emarginated apical margin, strongly dilated apically, transverse, 1.5× as wide as long; palpomere 4 large, narrow, cultriform, not wider than palpomere 3, about as long as palpomeres 2 and 3 combined. Labial palpi short, slender; terminal palpomere elongate, conical with pointed apex.

Pronotum transverse, 1.4× as wide as long, widest in posterior one-fifth, with base about as wide as elytral base; densely covered with small punctation; pronotal disc weakly convex, with four shallow, indistinct basal impressions. Anterior pronotal margin arcuate; posterior margin almost straight, distinctly bordered; lateral margins rounded, converging anteriad and weakly narrowed posteriad, lateral pronotal carina present apparently throughout its length (indistinctly visible in anterior one-fourth). Anterior pronotal angles rounded, indistinct; posterior angles nearly rectangular, rounded. Prohypomera wide, concave, densely covered with small punctation, distance between punctures smaller than diameter of one puncture. Notosternal suture distinct, complete. Protrochantins visible. Proster-

num convex, short before procoxal cavities, covered with dense, small punctuation. Prosternal process triangular, narrow, about 0.8× as maximum wide as transverse diameter of procoxa, short, not reaching procoxal posterior margin. Proxocal cavities open behind.

Scutellar shield rectangular, with weakly emarginated lateral margins and widely rounded apex, transverse, about 1.5× as wide as long, finely and densely punctate.

Fig. 1. *Serropalpus groehni* sp. nov., holotype, GPIH no. 5243: A – habitus, dorsal view; B – habitus, ventral view. Scale bars = 0.5 mm.

Elytra elongate, about 2.9× as long as wide, weakly convex, widest in anterior one-third, subparallel-sided in anterior two-thirds and gradually narrowed in posterior one-third; elytral apices rounded separately; elytral punctation irregular, small and dense, similar to pronotal punctation; each elytron with about six longitudinal furrows, distinct in anterior two-thirds; Sutural stria present. Epipleura narrow, widest basally and

gradually narrowed posteriad, incomplete, reaching to about middle length of abdominal ventrite 3. Mesosternal process short, reaching middle of mesocoxae; narrow, about 0.5× as wide as mesocoxa; weakly concave, with short lobes, each lobe about 0.15× as long as mesosternal process apical width. Metaventrite finely and densely punctate, with almost flat disc; discrimen deep, long, distinct in posterior two-thirds of metaventite length. Metathoracic wings present.

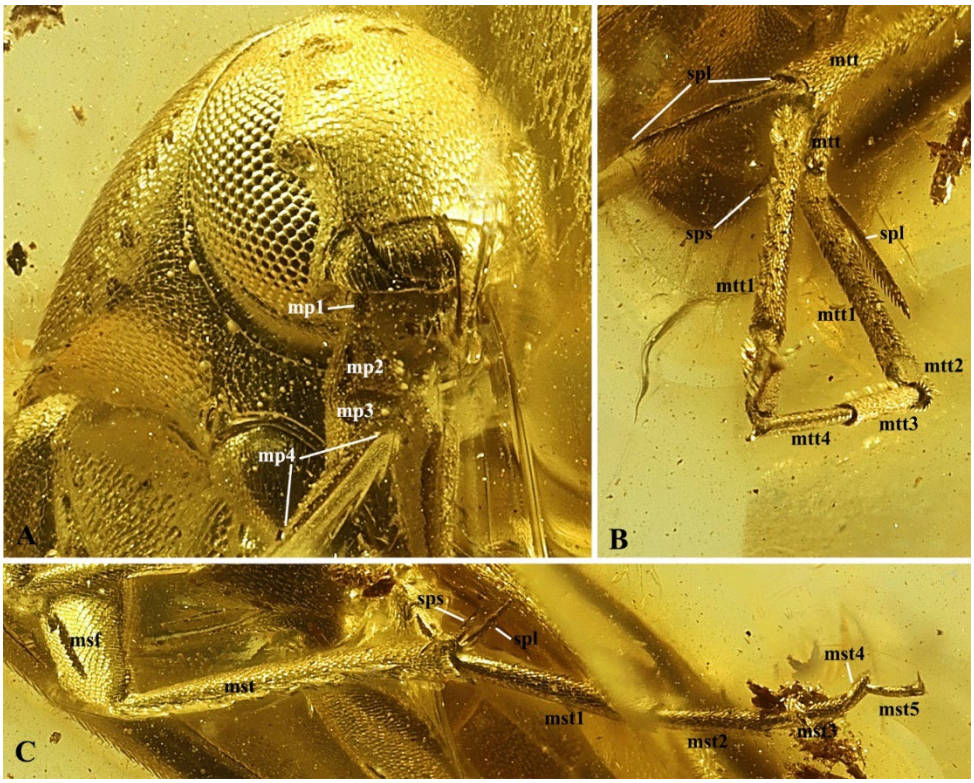

Fig. 2. *Serropalpus groehni* sp. nov., holotype, GPIH no. 5243: A – details of forebody, ventral view; B – metatarsi; C – right middle leg. Abbreviations: mp1–mp4 – maxillary palpomere 1 – maxillary palpomere 4; msf – mesofemorus; mst – mesotibia; mtt – metatibia; mst1–mst5 – mesotarsomere 1 – mesotarsomere 5; mtt1–mtt4 – metatarsomere 1 – metatarsomere 4; sps – short tibial spur; spl – long tibial spur. Not to scale.

Legs long and slender, finely punctate and pubescent. Procoxae oval, oblique, slightly projecting below prosternum, anteriorly separated; mesocoxae roundish, narrowly separated; metacoxae widely oval, transverse, narrowly separated. Femora nearly spindle-shaped, slightly flattened. Tibiae almost straight, slightly dilated apically; outer edge of meso- and metatibiae with 8–9 oblique rows of bristles. Tibial spurs serrate, paired; protibiae with two spurs of equal length, meso- and metatibiae with two spurs of different length (proportion of spurs length about 2:1), longest mesotibial spur about 0.35× as long as mesotarsomere 1, longest metatibial spur about 0.75× as long as metatarsomere 1. Tarsi long, protarsus slightly shorter than

protibial, meso- and metatarsi distinctly longer than meso- and metatibiae respectively; tarsal formula 5-5-4; protarsomeres 1–3 slightly dilated,protarsomere 4 bilobed, tarsomere 5 cylindrical; mesotarsomeres 1–3 and 5 cylindrical, mesotarsomere 4 bilobed, shortes; metatarsomeres 1–4 cylindrical, metatarsomere 1 longest, about as long as metatarsomeres 2–4 combined. Pretarsal claws simple, small, symmetrical.

Abdomen with five visible ventrites; finely and densely punctate; ventrite 5 simple, with rounded posterior margin; relative length ratios of ventrites 1–5 equal to 18:15:13:15:17 (medially).

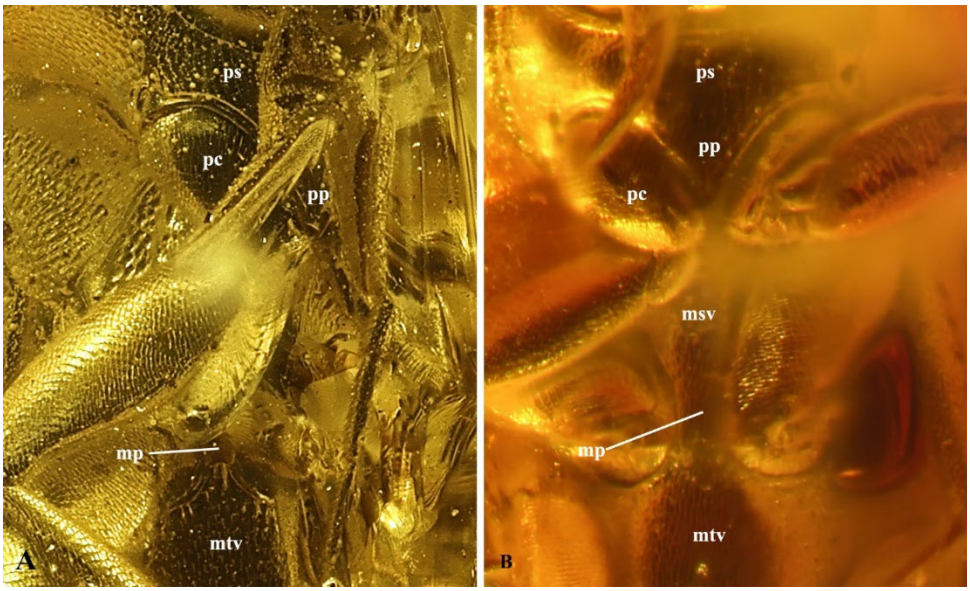

Fig. 3. Fossil *Serropalpus*, details of thorax, ventral view: A – *S. groehni* sp. nov., holotype, GPIH no. 5243; B – *S. ryzhkovianus* Alekseev, 2014, holotype, AWI-036 [CVIA]. Abbreviations: mp – mesosternal process; msv – mesoventrite; mtv – metaventrite; pc – procoxa; pp – prosternal process; ps – prosternum. Not to scale.

Differential diagnosis. *Serropalpus groehni* sp. nov. differs from fossil species of the genus in the combination of the following characters: (1) each elytron with about six longitudinal furrows, distinct in anterior two-thirds (in contrast to elytral furrows not discernible in *S. ryzhkovianus*); (2) longest metatibial spur about 0.75× as long as metatarsomere 1 (in contrast to *S. vivax* and *S. ingemmescus* having longest metatibial spur about 0.5× as long as metatarsomere 1 and *S. ryzhkovianus* having longest metatibial spur about 0.6× as long as metatarsomere 1); (3) weakly concave apex of mesosternal process (with semicircular concave and comparatively deep notch in *S. ryzhkovianus* as in Fig. 3B, and squarely truncated apex in *S. vivax*); and (4) meso- and metatibiae with 8–9 transverse rows of bristles (in contrast to *S. ingemmescus* having 12–14 transverse rows of bristles in outer edge of meso- and metatibiae). See also key below.

Derivatio nominis. The specific epithet is a patronym formed from the surname of Mr. Carsten Gröhn (Glinde, Germany), a enthusiast and specialist in Baltic amber.

A KEY TO EOCENE SPECIES OF *SERROPALPUS*

(modified from Alekseev & Bukejs 2021)

1. Meso- and metatibiae with 12–14 transverse rows of bristles; body length 6.5–9.5 mm. Baltic amber . . ……. *S. ingemmescus* Alekseev
– Meso- and metatibiae with 8–9 transverse rows of bristles. 2

2. Mesosternal process with semicircular concave notch at apex; elytra without furrows; body length 4.1–4.8 mm. Baltic and Rovno ambers. …*S. ryzhkovianus* Alekseev
– Apex of mesosternal process squarely truncated or weakly concave; elytra with 5–6 shallow furrows not reaching elytral apex ……..3

3. Apex of mesosternal process weakly concave; longest metatibial spur about 0.75× as long as metatarsomere 1; body length 4.3 mm. Rovno amber. . . . .. . *S. groehni* sp. nov.

– Apex of mesosternal process squarely truncated; longest metatibial spur about 0.5× as long as metatarsomere 1; body length 7.4–7.6 mm. Baltic amber . .. . . *S. vivax* Alekseev

NOTE ON THE PRESUMED PALAEOECOLOGY OF THE FOSSIL *SERROPALPUS*

Three representatives of the genus *Serropalpus*, *S. substriatus* Haldeman, *S. obsoletus* Haldeman, and *S. coxalis* Mank, occur in North America (Mank 1939); two species, *S. barbatus* Schaller and *S. marseuli* Nikitsky, are widely distributed from Europe to the Far East; and one species, *S. iriei* Toyoshima et Ishikawa, is restricted to Japan (Toyoshima & Ishikawa 2000; Nikitsky & Pollock 2008). Larvae of these Holarctic beetles with best-known bionomy tunnel within the xylem of conifers, the North American species are reported from Pinaceae (*Abies*, *Picea*, *Pinus*, and *Pseudostuga*) as well Cupressaceae (*Calocedrus*, *Chamaecyparis*, *Sequoia*, *Sequoiadendron*, and *Tsuga*), while the Holarctic species is mainly associated with *Abies* and *Picea* (Hoebeke & McCabe 1977; Camilli et al. 2012). A similar biology and relation with conifer forest habitats seem likely for the extinct Eocene *Serropalpus* species, including the newly described inclusion in Rovno amber.

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