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First Fossil Representative of the Family Omalisidae (Coleoptera, Elateroidea sensu lato) from the Baltic Amber

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Abstract—The paper describes *Jantarokrama utilis* Kovalev et Kirejtshuk, gen. et sp. nov., the first fossil representative of the family Omalisidae from the Upper Eocene Baltic amber, which is similar to the Recent *Phaeopterus unicolor* Costa, 1856, but distinguished from the latter by the larger and not so slender body, smaller distance between antennal insertions, longer antennae, wider prothorax with very convex anterior edge of the pronotum, and particularly by five completely exposed abdominal ventrites. The diagnosis of the new genus among generic taxa of Omalisidae and its similarity to *Berendtimirus* Winkler, 1987 (Berendtimiridae) are discussed.

Keywords: Coleoptera, Omalisidae, new taxa, Upper Eocene, Baltic amber

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INTRODUCTION

The family Omalisidae Lacordaire, 1857 is a rather small and very specialized group restricted in the Recent fauna to four genera spread in the western Palearctic (*Cimbrion* Kazantsev, 2010; *Omalisus* Geoffroy, 1762; *Phaeopterus* A. Costa, 1856; *Thilmanus* Gemminger, 1869). The only species with known biology, *Omalisus fontisbellaquaei* Geoffroy, 1785, has larvae associated with *Glomeris* sp. (Diplopoda) (Burakowski, 1988). The position of this family in the infraorder Elateriformia and the rank of the group still need further detailed investigation, although a currently adequate estimation of these problems has recently been published by Bocak and Brlik (2008); however, Crowson (1972) and Kazantsev (2005) preferred to consider *Thilmanus* as a member of Lycidae Laporte, 1840, while Kazantsev and Medvedev (1992) and also Kazantsev (2010) transferred it into Drilidae Lacordaire, 1857. Taking into consideration the biology of all mentioned groups, they seemed to have somehow restricted chances to show up in deposits and, on the other hand, the characteristic traces used for diagnosing them in compression remains are much more difficult for recognition than those used in Recent representatives. As a result, until this publication, the family Omalisidae has not been recorded beyond the Recent fauna. Winkler (1987) proposed the family Berendtimiridae for a species which looks somewhat similar to the new one (see Discussion below) and also described several fossil species assigned to Lampyridae Latreille, 1817 and Cantharidae Latreille, 1802 related to Omalisidae (Kirejtshuk and Ponomarenko, 2015).

MATERIAL AND METHODS

The holotype is housed in the Muséum national d'histoire naturelle. Observations were made using an Olympus SCX9 stereomicroscope in the Muséum national d'histoire naturelle and also a Leica MZ 16.0 stereomicroscope in the Zoological Institute of the Russian Academy of Sciences (St. Petersburg). The locality where this specimen was collected is not known, because it was extracted from one jewelry pendant and now the specimen is included in an amber bar with regular polished facets forming a quadrangle in cross section and having oblique ends (8.0 × 4.2 × 5.0 mm). The Baltic amber comes mostly from localities along the southern coasts of the Baltic Sea and is traditionally dated to the Upper Eocene (Prussian Formation, Priabonian, ca. 38 Ma).

SYSTEMATIC PALAEONTOLOGY

Family Omalisidae Lacordaire, 1857

Jantarokrama Kirejtshuk et Kovalev, gen. nov.

Etymology. From the Russian *yantar'* (amber) and the Greek *krama* (mixture); feminine gender.

Type species. *Jantarokrama utilis* Kirejtshuk et Kovalev, sp. nov.

D i a g n o s i s. Male. Body mediumsized, slightly dorsoventrally flattened, parallel-sided, well sclerotized. Head small, with prominent but flat antennal tubercles separated by median groove, longitudinal median carina before antennal insertions, distance between antennal insertions approximately equal to width of ultimate maxillary palpomere and also with slightly visible median line along about half length, smoothly sculptured. Eyes finely faceted, with maximum diameter (observed anteriorly) approximately equal to distance between eyes dorsally. Antennae filiform, antennomere 1 (scape) about 1.33 as long as very small antennomeres 2 and 3 combined, antennomeres 4–10 subequal in length, antennomere 11 narrow and longest. Mandibles long, slender, slightly curved. Ultimate maxillary palpomere subparallel-sided and obliquely truncate at apex. Ultimate labial palpomere short and pointed at apex. Pronotum rather widely transverse, its anterior edge rather convex and slightly concave in middle; lateral edge convex, posterior angles narrow and projecting obliquely backwards; disk roughly sculptured at lateral margins, rather smoothed along middle, sculptured lateral and shiny middle areas separated by sharp sublateral keels attached to posterior and anterior edges of pronotum. Prosternum comparatively long, about 1.5 times as wide as long, with short and slender prosternal process. Elytra subparallel-sided to broadly arcuate on sides, slightly more than twice as long as wide combined, with ten very slightly depressed rows (striae) of oval and comparatively fine punctures; interspaces between them slightly convex, although interspace 6 in anterior half forming sharp carina, much less conspicuous apically. Abdomen with ventrites 1–5 completely exposed and ventrite 6 considerably retracted. Legs slender, trochanters elongate. Tarsi with five tarsomeres; tarsomeres 1 simple and longest, tarsomeres 2 and 5 simple, subequal in length and each somewhat longer than simple tarsomere 3, tarsomere 4 strongly lobed and shortest; tarsal claws simple.

C o m p a r i s o n. This new genus is very similar to the monotypic Recent genus *Phaeopterus*, but differs from the latter in the larger and less slender body, the smaller distance between antennal insertions, the longer antennae with each antennomere elongated, particularly the scape, the wider prothorax with very convex anterior edge of the pronotum, and comparatively longer tarsomere 2. According to published data (Bocak and Brlik, 2008; Kazantsev, 2010; etc.), *Phaeopterus* like *Omalisus* has six abdominal ventrites completely exposed, while the holotype of the type species of the new genus shows only five ventrites; however, only the first four ventrites are widely truncate at the apex and the apex of ventrite 5 shows rounded lateral apical angles and a shallow median emargination in the middle of the posterior edge. Behind the apex of ventrite 5, the apex of the next ventrite is partly exposed, which, however, is completely exposed in the other mentioned genera. At the same time, ventrite 7, which is usually partly exposed in other omalisids, seems to be completely concealed in the holotype under description. In addition to the peculiar structure of the abdomen, the new genus is distinguished from all members of the family by the particularly long scape and somewhat longer each antennomere, more narrowly separated antennal bases, and much shorter elytra with broadly arcuate sides. In addition, *Jantarokrama* gen. nov. differs from *Omalisus* in the sharp sublateral carinae on the pronotum, the shape of prosternum, lack of elytral costae (except the costa on the basal part of interspace 6 between rows of punctures); from *Cimbrion* in the less arcuate pronotal sides; and from *Thilmanus* in the convex (instead of concave) pronotal sides, much shorter prosternum with different outline, regular elytral sculpture, less elongate trochanters, and wider other sclerites of legs. As for elytral punctation, the new genus is similar in it to *Cimbrion* but the punctures in rows in *Jantarokrama* gen. nov. are somewhat coarser and interspaces between them are rather flattened.

***Jantarokrama utilis* Kirejtshuk et Kovalev, sp. nov.**

E t y m o l o g y. From the Latin *utilis* (useful, helpful, beneficial, fit, suitable).

H o l o t y p e. MNHN, no. A52062 (“283”), male; Baltic amber, Upper Eocene. Specimen is completely included in an amber bar with some longitudinal cracks and with “milky” covering on many sclerites.

D e s c r i p t i o n (Figs. 1, 2). Male. The body is subunicolored dark brown to blackish. The head has weakly developed, slightly elevated, and slightly separated tubercles above antennal insertions, a shallowly emarginated anterior edge, and slightly exposed labrum. Antennomere 1 (scape) is more than twice as long as wide at the apex; antennomeres 4–10 are very long and three or four times as long as wide at the apex; antennomere 11 is more than five times as long as wide and bluntly pointed at the apex. The maxillary palpi are somewhat longer and the labial palpi are somewhat shorter than the scape. The pronotum is about 1.5 times as wide as long; the median smoothed stripe has small sparse punctures, apparently as large as eye facets and interspaced by 3–4 puncture diameters. The prosternum is subquadrangular with shallowly emarginate anterior and lateral edges and shallowly sinuate on each side of short and narrow prosternal process. The scutellum is subtriangular to pear-shaped, slightly longer than wide at the base and widely rounded at the apex. Each elytron has ten not quite regular rows of punctures, which vary somewhat in size; the spaces between these rows of punctures are equal to 1.5–3.0 puncture diameters. The pygidium is not exposed from under elytral apices. The metaventrite is almost twice as wide as long. The metepisterna are subparallel-sided. The abdomen has ventrites 1–5 subequal in length, ventrite 5 rounded at lateral apical angles and shallowly emarginate in the middle, and ventrite 6 considerably retracted. The trochanters are about 1.5 times as long as wide at the base. The femora

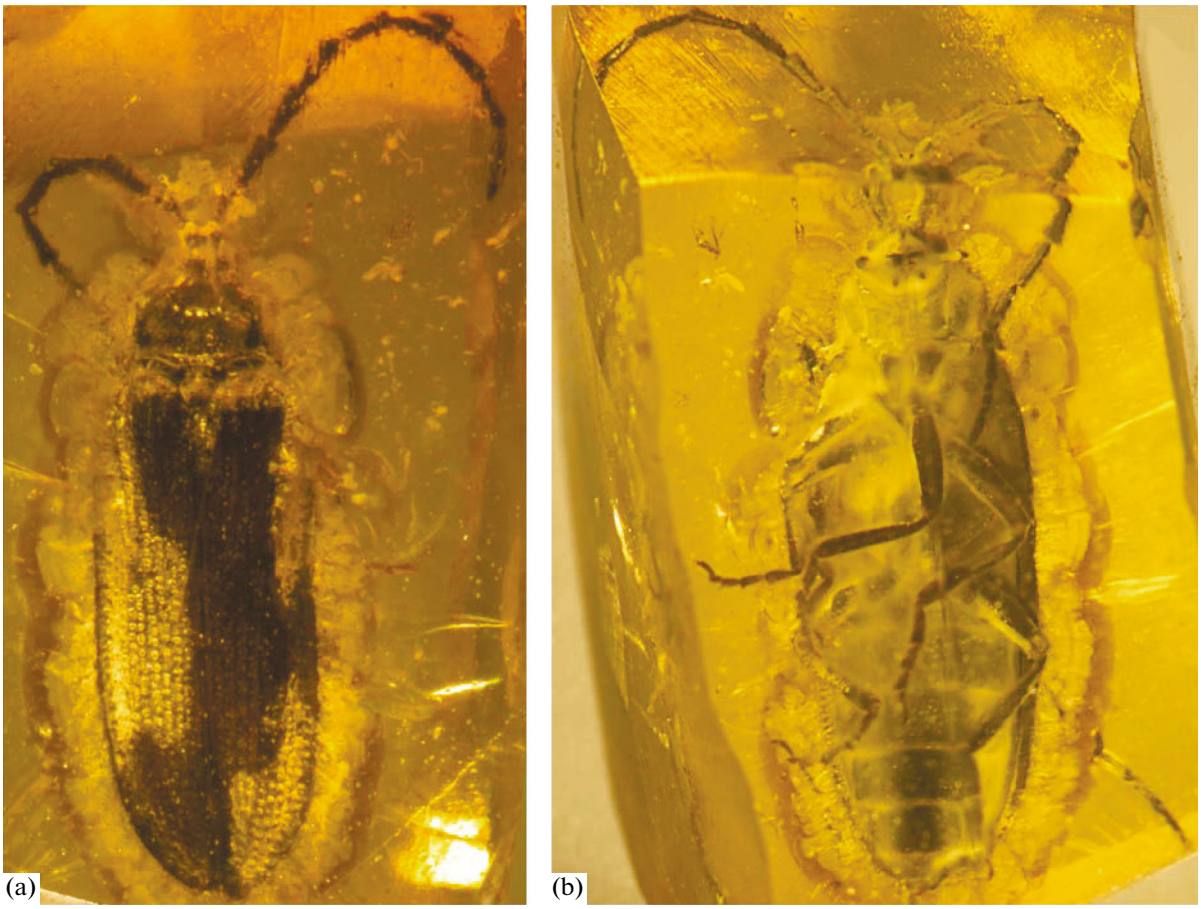

Fig. 1. *Jantarokrama utilis* gen. et sp. nov., holotype MNHN no. A52062, body, Baltic amber, Upper Eocene: (a) dorsal and (b) ventral views. Specimen is 5.4 mm long.

are 4.5–5.5 times as long as wide. The tibiae are almost eight times as long as wide, rounded at the apex and lack spurs.

Measurements in mm. Male. Length, 5.4; width, 1.7; height, 1.2.

DISCUSSION

Jantarokrama utilis gen. et sp. nov. is unique among members of this family in having only five complete abdominal ventrites exposed. The number of abdominal ventrites in the family lineage, close to Cantharidae ("Cantharoidea") is rather important for diagnostics and classification of this lineage of Elateroidea. Because of the progressive pedomorphic transformation of individual development at the pupal stage, the number of exposed abdominal ventrites in adults increased in more advanced groups of this lineage (Crowson, 1972). As a result, the number of completely exposed ventrites varies from five in "Elateroidea sensu stricto" to seven (or even eight) in some younger advanced groups ("Cantharoidea"). The latter groups demonstrate some parallelisms in structural transformations of adults, making taxonomic work particularly difficult. *Jantarokrama utilis* gen. et sp. nov. has a rather plesiotypic character of its imaginal abdomen within Omalisidae. This form has a considerable similarity and close relationship with members of this family; however, its elytral shape and sculpture (seriate punctation and short humeral carina along interspace 6) are also surprisingly similar to that of *Berendtimirus progenitor* Winkler, 1987, while the latter possesses features quite different from those in other families related to Cantharidae, which are probably also plesiotypic (in particular, in antennae with very long antennomeres 2 and 3), but it has 6 abdominal ventrites in male (Winkler, 1987). Thus, the shared similarity of *Jantarokrama utilis* gen. et sp. nov., *Phaeopterus unicolor* Costa, 1856, and *Berendtimirus progenitor* in their elytral structure and sculpture could have resulted from homoplasy.

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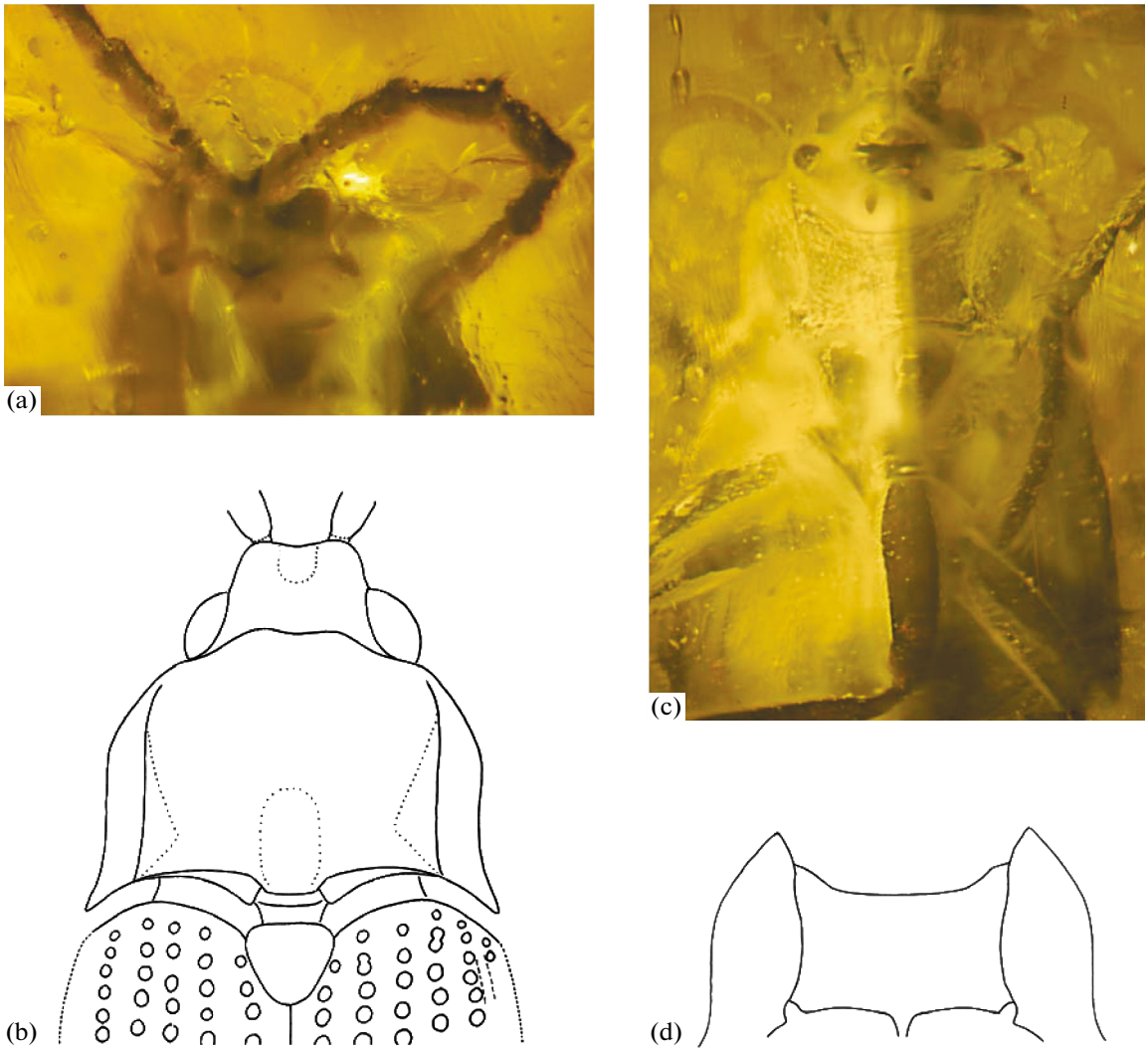

Fig. 2. *Jantarokrama utilis* gen. et sp. nov., holotype MNHN, no. A52062, Baltic amber, Upper Eocene: (a) head and prothorax, anteroventral view; (b) head, pronotum, and elytral base, dorsal view; (c) anterior part of body, ventral view; (d) prosternum and prohypomera, ventral view. Fore part of specimen is 2.7 mm long.

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