



A new soldier beetle from Eocene Baltic amber

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The family Cantharidae is a worldwide distributed group of flattened and soft-bodied beetles displaying aposematic colouration. These beetles, commonly known as soldier beetles, have an extensive fossil record dating back to the Lower Cretaceous. The majority of fossil material, referred to Cantharidae, is known from amber inclusions. In this paper we describe and illustrate a new soldier beetle *Kuskaella macroptera* gen. et sp. nov. from the Baltic amber. It is characterised by pronotum of the male parallel-sided in basal third and abruptly narrowed towards apex, and of the female gradually and steadily narrowing from the basal margin to the apex; globular head; unequal maxillary palpomeres with the last segment elongated-globular and pointed; long elytra slightly surpassing the last abdominal segment. This finding is the first described species of both sexes preserved in a single amber piece.

Introduction

Baltic amber is very rich in inclusions and also interesting with regard to soldier beetles, with many genera and species (21 taxa) already described (for a complete list see: Fanti 2017a–c). Besides the current genera, it is worth to mention that several interesting taxonomic features can be observed in the extinct genera, e.g., the saucer-shaped central antennomeres of *Cacomorphocerus* Schaufuss, 1892, that we currently find in the specimens from Neotropical region, or the carinate pronotum (similar to Lycidae) of *Mimoplatycis* Kazantsev, 2013, or the large number of antennal articles of *Electronycha* Kazantsev, 2013, *Sucinocantharis* Kuška and Kania, 2010 and *Michalskantharis* Fanti, 2017, unknown in extant species (Schaufuss 1892; Kuška and Kania 2010; Kazantsev 2013; Fanti 2017b). The new taxon herein described is also peculiar because of the long elytra and the aedeagus with long lobe apically roundish (Figs. 1, 2C), and since it is the first described species with both sexes preserved in the same amber piece. Until now, Cantharidae in mating have been known, at undetermined level, only as photographs (Wichard and Weitschat 2004; Weitschat 2009; Wichard and Greven 2009), two males of *Malthodes ceranowiczae* Kuška and Kupryjanowicz, 2005 have been known in the same piece of amber (Kuška and Kupryjanowicz 2005) and both sexes of *Sucinorhagonycha kulickae* Kuška, 1996 (Kuška 1996; Kubisz 2000) have been known but coming from different amber pieces. Finally, *Cacomorphocerus jantarticus* (Kuška and Kania, 2010) and *Mimoplatycis notha* Kazantsev,

2013 are known from various male specimens (Kuška and Kania 2010; Kazantsev 2013; Kazantsev and Perkovsky 2014).

Institutional abbreviations.—UCP UwB, University of Białystok, Poland.

Material and methods

The examined material originated from the Baltic Sea coast of Poland in the Gdańsk region, and is deposited in the JK collection at Andrzej Myrcha Nature Center of UCP UwB. The specimens are included in a rectangular amber piece measuring $9.4 \times 5.2 \times 4.2$ mm which was polished by hand and faceted on their sides, allowing improved views of the included specimens. Observations, digital photographs, and measurements were taken using an Olympus DSX110 stereomicroscope and camera with image sensor 1/1.8 inch, 2.01 megapixels, colour CCD equipped by lens DSXPLFL 3.6x.

Systematic palaeontology

Class Insecta Linnaeus, 1758

Order Coleoptera Linnaeus, 1758

Superfamily Elateroidea Leach, 1815

Family Cantharidae Imhoff, 1856

Subfamily Malthininae Kiesenwetter, 1852

Tribe *incertae sedis*

Genus *Kuskaella* nov.

Etymology: In memory of Antoni Kuška (1940–2010), Polish expert of soldier beetles + the Latin suffix *-ella* (diminutive). Gender: feminine.

Type species: *Kuskaella macroptera* gen. et sp. nov.; monotypic, see below.

Diagnosis.—As for the type species by monotypy.

Stratigraphic and geographic range.—Baltic amber, middle Eocene to late Eocene, Poland, Gdańsk region, Baltic Sea coast.

Kuskaella macroptera sp. nov.

Figs. 1, 2.

Etymology: From Ancient Greek μακρός (*makrós*), large, extended, and πτερόν (*pterón*), wing; named in reference to the long elytra.

Type material: Holotype: male, UCP UwB 222a (Figs. 1, 2). Paratype: female, UCP UwB 222b (Fig. 1). Both holotype and paratype are inclusions in the same Baltic amber piece (UCP UwB 222) associated with syninclusions of a few small wood remains and one stellate trichome.

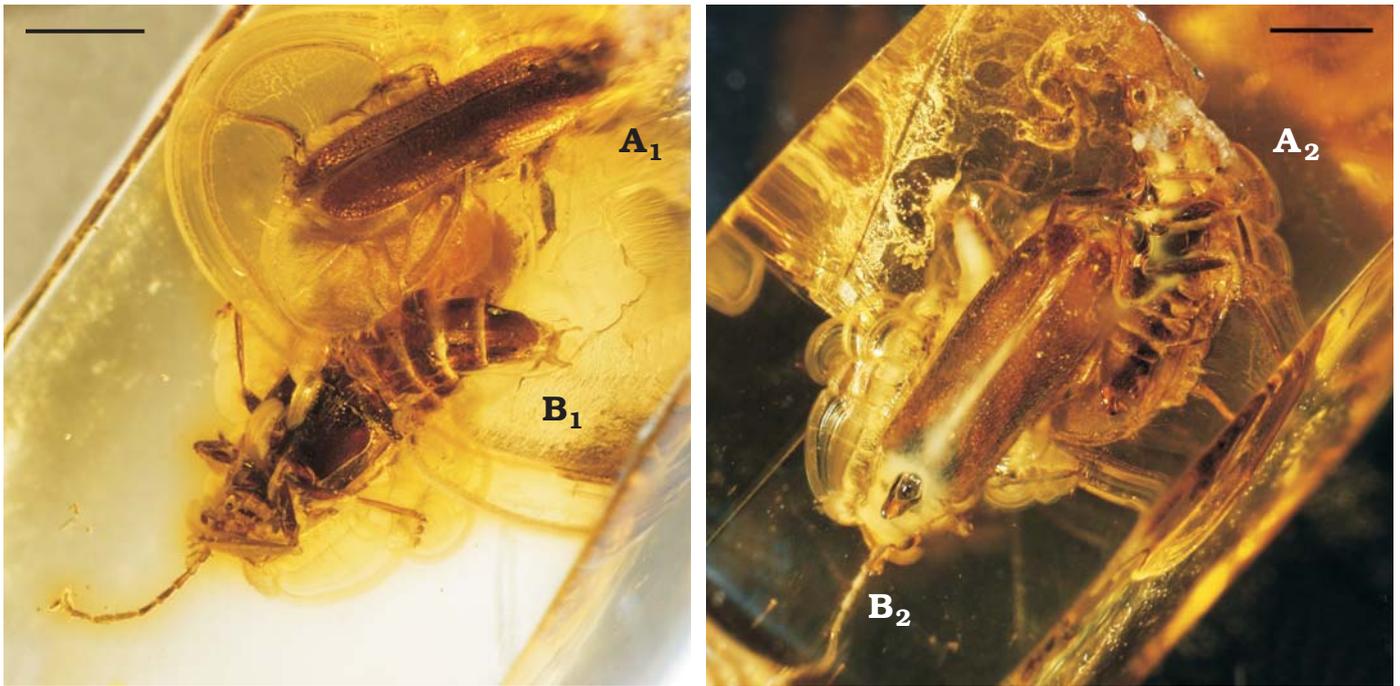


Fig. 1. Soldier beetle *Kuskaella macroptera* gen. et sp. nov. in Baltic amber, middle Eocene to late Eocene; Poland, Gdańsk region. **A.** Holotype, UCP UwB 222a, male in dorsal (A_1) and ventral (A_2) views. **B.** Paratype, UCP UwB 222b, female in ventral (B_1) and dorsal (B_2) views. Scale bars 1 mm.

Type locality: Poland, Gdańsk region, Baltic Sea coast.

Type horizon: Lutetian (middle Eocene; 47.8–41 My) to Priabonian (late Eocene; 38–33.9 My).

Material.—Type material only.

Diagnosis.—The unequal maxillary palpomeres with the last segment elongated, roundish and globular, equipped with very elongated thin and pointed appendix, is typical of the subfamily Malthininae. It is characterised by 11 filiform antennomeres; head globular, little exposed; third tarsomere not bilobed at sides; male pronotum with parallel sides and narrowed from the basal third, and particularly, for the long elytra reaching and slightly surpassing the last urites, with wrinkled surface but without trace of costae or reticulation.

Description.—*Male:* Body length: 3.5–3.6 mm; elytral length: 2.6 mm, width: 0.9 mm. Adult, winged, entirely dark brown. Head globular, as wide as the apical margin of the pronotum, partially hidden under pronotum, fitted with long and thick setae. Eyes large, round and strongly convex, inter-ocular distance about 2.0 times greater than eye diameter. Mandibles not visible. Maxillary palpomeres unequal, with first segment short and globular, second elongated twice as long as first, third of intermediate length between the first and the second one, fourth segment very elongated slightly rounded-globular and equipped with a thin elongated sharp apical appendix (Fig. 2A). Labial palps 3-segmented with the last article globular and pointed. Antennae 11-segmented, filiform, inserted at short distance from the eyes and near the middle, scape long and inflated; antennomere II approximately one-half as long as scape and apically slightly swollen; III filiform, 1.2 times longer than second; III–XI sub-equal and about 1.5 times longer than II; all an-

tennomeres covered with sparse setae of two different lengths. Pronotum large at base, parallel-sided, abruptly narrower from the basal third to the apex; margins slightly clinched, more evidently near the posterior corners; surface flat, with very sparse shallow punctation and fitted with short setae. Scutellum triangular, narrowed in the middle, and rounded at apex. Elytra elongated, dark brown with a black triangular spot covering the humeral and scutellar zone; basally wider than pronotum, narrowed and parallel-sided after humeri, reaching and slightly surpassing the last abdominal segment; surface strongly wrinkled with few short setae; apical part of the elytra rounded (Fig. 1A₁). Posterior wings pale, folded almost completely under the elytra and visible only as a small apical part. Prosternum dark brown, quadrangular and hairless. Abdominal segments short and large with raised short pubescence; the last one elongated and roundish (Fig. 1A₂). Legs dark brown, with various setae on each segment; coxae massive, elongated and globular; pro- and mesotrochanters basally narrowed, roundish and widened from the middle to apex, metatrochanters more triangular at apex; femora elongated and cylindrical; tibiae slender, cylindrical, slightly longer than femora, basally thinner and apically wider; tarsi 5-segmented, first one elongated and approximately 1.2 times longer than second, second and third elongated and slightly widened apically, third slightly shorter than second, fourth segment strongly bilobed at sides, five elongated and thin; claws simple without denticle (Fig. 2B). Visible part of aedeagus with lobe very elongated and apically roundish with a horizontal appendix (probably the sternal shield) and another, little but enlarged and roundish bit at the base (Fig. 2C).

Female: Adult, winged, similar to male but less slender, entirely dark brown except for a black scutellar zone. Body

length: 3.9–4.2 mm; elytral length: 3.0 mm, width: 1.2 mm. Head globular very hidden under pronotum and fitted with a few setae. Eyes large, round and strongly convex, inter-ocular distance about 2.2 times greater than eye diameter. Antennae 11-segmented, similar to male but slightly shorter. Pronotum gradually and steadily narrowing from basal margin to the apex, apical edge extended in a rounded lobe over the head (Fig. 1B₂). Scutellum triangular with roundish apex. Elytra elongated, largely surpassing the last abdominal segment, parallel-sided, dark brown with a black triangle on the humeral and scutellar zone, surface strongly wrinkled and pubescent. Legs and sternum as in male. Last abdominal segment elongated and slightly widened compared to male (Fig. 1B₁).

Remarks.—The new taxon shows peculiar characteristics among the subfamily Malthininae: pronotum narrowed anteriorly and elytra long, with evident roughness and without costae or reticulation. On the other side, it looks very similar to *Rhagonycha sucinobaltica* Poinar and Fanti, 2016. In the holotype of the latter species, the maxillary palpomeres are not well visible, but the last segment seems elongated and roundish (slightly globular to slightly securiform) and the claws are apically bifid, both characters strongly support its attribution to the genus *Rhagonycha*. Although the visible part of the aedeagus seems to show common characters (particularly, the elongated, apically roundish lobe), *Kuskaella macroptera* gen. et sp. nov. shows simple claws. Moreover, *Kuskaella* gen. nov. is easily recognisable due to the male pronotum parallel-sided and narrower from the basal third to apex, while in *Rhagonycha sucinobaltica*, it shows evident concavities on the sides and rounded posterior corners (Poinar and Fanti 2016).

Stratigraphic and geographic range.—Type locality and horizon only.

Concluding remarks

The family Cantharidae is divided into five subfamilies, of which Malthininae show unequal maxillary palpomeres with the last segment globular and often pointed. This important and macroscopic character is limited to this subfamily, except for the Silinae Tytthonyxini Arnett, 1962 and the genus *Plectocephalon* Pic, 1928 (Dysmorphocerinae), appearing as a recent specialization (Brancucci 1980). Actually, Tytthonyxini are placed as incertae sedis within the subfamily Silinae, between Malthininae and Silinae, due to the unusual structure of the abdominal sternites and genitalia, while most of the representatives of Dysmorphocerinae have the last maxillary palpomeres securiform or globular with pinched apical part (in *Plectocephalon*, they become pointed for an assumed convergence). In our opinion, this significant difference suggests that both taxa are more related to the subfamily Cantharinae rather than to Malthininae, where this kind of palps might be con-

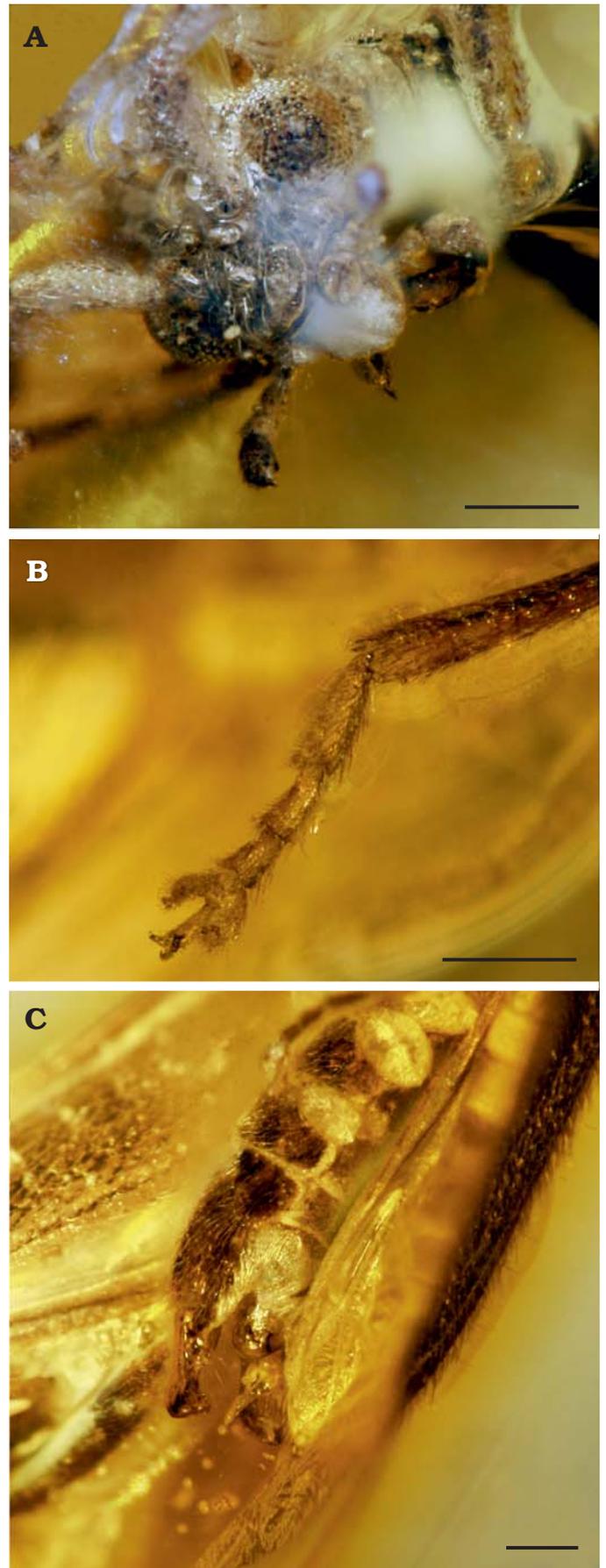


Fig. 2. Soldier beetle *Kuskaella macroptera* gen. et sp. nov., holotype (UCP UwB 222a), in Baltic amber, middle Eocene to late Eocene; Poland, Gdańsk region. **A.** Detail of palps (ventral view). **B.** Detail of claws. **C.** Detail of the visible part of aedeagus. Scale bars 200 μ m.

sidered to be separately and subsequently developed. Several Malthininae show reduced elytra and only *Mimoplatycis* Kazantsev, 2013, *Inmalthodes* Pic, 1938, *Mimomalthinus* Pic, 1931, *Malthinus* (*Indomalthinus*) Brancucci, 1978, and *Macrocerus* Motschulsky, 1845 have long elytra (Pic 1938; Brancucci 1980, 1983; Kazantsev 2006, 2013), but none of them seems to be closely related to *Kuskaella macroptera* gen. et sp. nov.. In fact, *Mimoplatycis* shows a carinate pronotum, *Inmalthodes* displays “reticulate” elytra, *Macrocerus* and *Mimomalthinus* have different pronotal shape and *Malthinus* (*Indomalthinus*) yields prolonged metacoxae. In our opinion *Kuskaella* gen. nov. belongs neither to *Mimoplatycini* Kazantsev, 2013 nor to *Malthinini* Brancucci, 1980 but we are uncertain whether it belongs either to *Malthinini* Kiesenwetter, 1852 or *Malthodini* Böving and Craighead, 1931 though the habitus and the small visible part of aedeagus, with a sort of elongated lobe with very globular apex, are all suggestive of a new tribe. Furthermore, the long elytra of Malthininae also appear to be a derivative character (Brancucci 1980), thus, elongated-globular pointed palps and long elytra suggest that *Kuskaella* is a very specialized genus or that it should be accommodated in a new tribe.

The Baltic amber described herein contains extraordinary fossil soldier beetles with both sexes preserved in the same amber piece. It is likely that these individuals perished while mating or feeding on the same food source.

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