



## **A new species of *Cacomorphocerus* Schaufuss, 1892 (Coleoptera: Cantharidae) from Baltic amber with a key to known species**

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### **ABSTRACT**

*Cacomorphocerus eocenicus* sp. nov. (Coleoptera: Cantharidae) is described and illustrated on the base of one well-preserved specimen from Eocene Baltic amber. It is the sixth described species of this fossil genus, and it is characterized by possessing antennomeres 6–7 that are slightly modified and dilated (while antennomeres 3–9 are modified, and saucer-shaped in other known species). A key to the fossil species of *Cacomorphocerus* is here provided.

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### **INTRODUCTION**

The fossil genus *Cacomorphocerus* Schaufuss, 1892, comprises five species described from the Eocene Baltic amber: *C. cerambyx* Schaufuss, 1892; *C. jantarius* (Kuška and Kania, 2010); *C.*

*wiszniewskii* Fanti and Kupryjanowicz, 2018; *C. bentifabrizii* Fanti and Damgaard, 2018; and *C. madseni* Fanti and Damgaard, 2018. One undescribed specimen belonging to this genus has also been reported from the Upper Eocene Rovno

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amber (Kazantsev and Perkovsky, 2014). In the present paper, a new species of *Cacomorphocerus* is described and illustrated from Baltic amber. The addition of this new species may substantially contribute to the understanding of the diversification pattern of this enigmatic genus throughout Eocene and provide new data that will help to understand and highlight Cantharidae evolution.

## MATERIAL AND METHODS

The material examined is deposited in the Palaeontology Collection of the Royal Saskatchewan Museum (Regina, Saskatchewan, Canada) [RSM]. Observations of this specimen were made using a Nikon SMZ 745T stereomicroscope. Photographs were taken using a Visionary Digital imaging system, consisting of a Canon EOS 5D camera with a Canon MP-E 65 mm macrophotography lens, attached to an automated camera lift with studio flash lighting. Extended depth of field at high magnifications was achieved by combining multiple images from a range of focal planes using Helicon Focus 6.8.0 software, and the resulting images were edited to create figures using Adobe Photoshop CS5.

## SYSTEMATIC PALAEONTOLOGY

Order COLEOPTERA Linnaeus, 1758  
Family CANTHARIDAE Imhoff, 1856  
Subfamily CANTHARINAE Imhoff, 1856  
Tribe CACOMORPHOCERINI Fanti and  
Kupryjanowicz, 2018

Genus CACOMORPHOCERUS Schaufuss, 1892

**Type species.** *Cacomorphocerus cerambyx* Schaufuss, 1892.

**Diagnosis.** The genus is recognizable by the last maxillary palpomere securiform, the elytra elongate, and 12-segmented antennae with medial antennomeres saucer-shaped (antennomeres 3–9) or with antennomeres 6–7 slightly dilated and asymmetrical. Furthermore, it is characterized by claws with tooth basally, while the claws are without tooth or lobe in the related genus *Sucinorhagonycha* Kuška, 1996.

**Included species.** *Cacomorphocerus cerambyx* Schaufuss, 1892; *C. jantarius* (Kuška and Kania, 2010); *C. wiszniowskii* Fanti and Kupryjanowicz, 2018; *C. bentifabrici* Fanti and Damgaard, 2018; *C. madseni* Fanti and Damgaard, 2018; and *C. eocenicus* sp. nov.

**Distribution.** The genus appears to be limited to the Eocene and is recorded in the Baltic and Rovno amber.

**Remarks.** The specimen considered here is assigned to *Cacomorphocerus* on the basis of the following morphological characters: (1) last maxillary palpomere securiform; (2) elytra elongated; (3) antenna 12-segmented with antennomeres 6–7 modified (antennomere 6 robust and widened, and antennomere 7 asymmetrical, transverse), and antennomeres 10–12 filiform; (4) tarsomere 3 straight, not bilobed; and (5) tarsal claws with small tooth basally.

*Cacomorphocerus eocenicus* sp. nov.

Figures 1–2

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**Type material.** Holotype: collection number P3300.140 [RSM], adult, sex unknown. Complete beetle with partially exposed hind wings, included in transparent, yellow, elongate amber piece (35×16×10 mm), and preserved without supplementary fixation. Ventral surface of the beetle almost entirely obscured, because of specimen location within the amber piece and veil of milky amber. Syninclusions: few small gas vesicles and pieces of organic material.

**Type strata.** Baltic amber, Middle Eocene to Upper Eocene.

**Type locality.** Baltic Sea coast, Yantarny settlement (formerly Palmnicken), Kaliningrad region, Russia.

**Etymology.** This new species is named after its geological epoch.

**Differential diagnosis.** *Cacomorphocerus eocenicus* sp. nov. differs from *C. cerambyx*, *C. jantarius*, *C. wiszniowskii*, *C. bentifabrici*, and *C. madseni* in possessing antennomeres 6–7 that are slightly modified and dilated (while antennomeres 3–9 are modified, saucer-shaped in above mentioned species), and smaller body size. Additionally, *C. eocenicus* sp. nov. has slightly transverse pronotum (about 1.1× as wide as long), with anterior margin slightly rounded and convex, lateral margins straight (in lateral view), sculpture of disc simple with two tubercles, and angles without denticles. In contrast, *C. cerambyx* has quadrate pronotum with longitudinal impression; *C. jantarius* has rectangular pronotum (in dorsal view) with small denticles situated near each anterolateral corner, and disc with two tubercles; *C. wiszniowskii* has sub-rectangular pronotum with denticles laterally; *C. bentifabrici* has slightly elongate pronotum with anterior margin strongly rounded and protruding, and with two thickenings near posterior margin; *C. madseni* has pronotum with deep transverse incision medially, and with denticles



**FIGURE 1.** *Cacomorphocerus eocenicus* sp. nov. in Baltic amber, holotype, P3300.140 [RSM], habitus, dorso-lateral (1), and lateral (2) views. Scale bars represent 1 mm.





**FIGURE 2.** *Cacomorphocerus eocenicus* sp. nov. in Baltic amber, holotype, P3300.140 [RSM], details of forebody, in lateral view (1), left antenna (2). Scale bars represent 0.25 mm.

present at posterior angles and near the mid-length of lateral margins. See also key in Appendix 1.

**Description.** Body length about 5.2 mm (head length = 0.5 mm, pronotal length = 0.8 mm, elytral length = 3.9 mm); body nearly parallel-sided, elongate, flattened dorsally (Figure 1.1-2); body integument rufous in color with head, apical half of antennae, pronotal disc (anteromedially), elytral suture (in basal one-third), metathorax, abdomen, and meso- and metafemora darker, brown to dark brown; pronotum and elytra sparsely covered with moderately long, semierect setae (pronotal setation slightly shorter), head with recumbent, short, fine setae.

Head (Figure 2.1) prognathous, rounded, shiny, and apparently with fine, indistinct punctures. Eyes moderately large, nearly round, and convex. Maxillary palpus 4-segmented; palpomere 1 short, semiglobular; palpomere 2 cylindrical, longest, about 1.7× as long as palpomere 3; pal-

pomere 4 securiform. Labial palps 3-segmented. Antennae filiform, 12-segmented (Figure 2.2), pubescent, and long, almost reaching middle of elytra; antennal insertion situated in the proximity of lower margins of eye; scape elongate, subcylindrical, about 3× as long as wide; pedicel short, 0.5× as long as scape; antennomeres 3–5 subequal in length and shape, slightly dilated apically; antennomeres 6–7 modified, with antennomere 6 robust and widened, and antennomere 7 asymmetrical, transverse, about 1.5× as wide as long; antennomere 8 short, subcylindrical, distinctly dilated apically; antennomeres 9–12 elongate, subcylindrical. Relative length ratios of antennomeres 1–12 equal to 13:7:10:9:10:10:5:7:10:10:11:16.

Pronotum slightly transverse, about 1.1× as wide as long, narrower than head, sparsely covered with fine punctures; pronotal disc with two longitudinal tubercles medially (Figure 2.1); anterior margin slightly rounded and convex, lateral margin

straight (in lateral view), simple, and all margins slightly upturned; anterior angles rounded, posterior angles obtuse, apparently without denticles at angles.

Scutellar shield large, triangular with widely rounded apex, about as long as wide.

Elytra long (Figure 1.1), about 4.3× as long as pronotum, at base distinctly wider than pronotum, subparallel-sided, with rounded apex, covering and surpassing last abdominal ventrite, with fine and sparse punctation. Macropterous.

Legs long and slender, densely pubescent; coxae large; femorae and tibiae thin, subcylindrical, subequal in length; tibiae almost straight, with two apical spurs; tarsi 5-segmented, long; mesotarsus nearly as long as mesotibia; metatarsomeres 1 and 2 equal in length and about 1.3× as long as metatarsomere 3; metatarsomere 3 straight at apex, not bilobed; metatarsomere 4 bilobed; metatarsomere 5 slender, subcylindrical, curved, about 1.8× as long as metatarsomere 3; claws thin, with small denticle basally.

## DISCUSSION

The extensive Eocene Baltic amber-producing forest has yielded a rich fauna of Cantharidae. The genus *Cacomorphocerus* seems to be particularly widespread and common in Baltic amber, but is also present in Rovno amber. Together with the genera *Sucinocantharis* Kuška and Kania, 2010, *Eridanula* Fanti and Damgaard, 2018, and *Noergaardia* Fanti and Damgaard, 2018, *Cacomorphocerus* belongs to the extinct tribe Cacomorphocerini Fanti and Kupryjanowicz, 2018. This tribe is characterized by 12–19 segmented antennae with strongly modified and saucer-shaped medial antennomeres (Fanti and Kupryjanowicz, 2018). Based upon their distinctive

antennal shapes, members of the tribe have been considered similar to the South American genus *Dysmorphocerus* Solier, 1849 (composed of four species from Chile) (Delkeskamp, 1939, 1977; Constantin, 2008), and were later considered to belong within the subfamily Dysmorphocerinae Brancucci, 1980 (Kazantsev, 2013). However, Dysmorphocerinae is known almost completely from the former components of Gondwana (Brancucci, 1980). More recently, the genus *Cacomorphocerus* has instead been recognized as part of the subfamily Cantharinae, with an apparent origination during the Eocene.

Despite extensive study, records of closely related species are unknown from older amber deposits, such as Late Cretaceous Burmese amber, as well as younger deposits, such as Miocene Dominican amber (Fanti, 2017; Ross, 2018). The apparent absence of this group in the older deposits and their apparent concentration in the Eocene European amber, suggests a possible origin and extinction of the group during the Eocene. Furthermore, the modified antennomeres present in *C. eocenicus* sp. nov. and the other congeners suggest that this trait may have evolved from filiiform antennae at the beginning or within the Eocene. At the moment, nothing similar to *Cacomorphocerus* has been recorded in North America, although several deposits, as the Florissant Formation of Colorado (USA) contain various fossils Cantharidae (Fanti, 2017). The existing palaeobiogeographic evidence suggests that the genus and tribe likely had a European or Palaearctic distribution while they existed. Hopefully, further studies will shed additional light on the full temporal and spatial range of these unusual members of Cantharidae.

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## REFERENCES

- Brancucci, M. 1980. Morphologie comparée, évolution et systématique des Cantharidae (Insecta: Coleoptera). *Entomologica Basiliensia*, 5:215-388.
- Constantin, R. 2008. A contribution to the genus *Plectonotum* Gorham, 1891 in Ecuador (Coleoptera, Cantharidae). *Entomologica Basiliensia et Collectionis Frey*, 30:49-74.
- Delkeskamp, K. 1939. Pars 165: Cantharidae, pp. 1-357. In Junk, W. and Schenckling, S. (eds.), *Coleopterorum Catalogus*. Gravenhage, Dr. W. Junk Verlag für Naturwissenschaften.
- Delkeskamp, K. 1977. Cantharidae, p. 1-487. In Wilcox, J.A. (ed.), *Coleopterorum Catalogus Supplementa Pars 165 (1)*. W. Junk, The Hague.
- Fanti, F. 2017. World catalog of fossil Cantharidae. *Fossils & Minerals Review*, 2 (Special Issue):1-52.

- Fanti, F. and Damgaard, A.L. 2018. Fossil soldier beetles from Baltic amber of the Anders Damgaard amber collection (Coleoptera Cantharidae). *Baltic Journal of Coleopterology*, 18(1):1-32.
- Fanti, F. and Kupryjanowicz, J. 2018. Discovery of a new fossil soldier beetle in Eocene Baltic amber, with the establishment of the new tribe Cacomorphocerini. *Annales de Paléontologie*, 104(2):149-153. <https://doi.org/10.1016/j.annpal.2018.02.001>
- Imhoff, L. 1856. *Versuch Einer Einführung in das Studium der Koleoptern. In Zwei Theilen Undeinem, 25 Tafeln Lithographirter Abbildungen Nebst Text Enthaltenden, Anhang. Auf Kosten des Verfassers*. Schweighauser, Basel. <http://doi.org/10.3931/e-rara-51785>
- Kazantsev, S.V. 2013. New taxa of Baltic amber soldier beetles (Insecta: Coleoptera: Cantharidae) with synonymic and taxonomic notes. *Russian Entomological Journal*, 22(4):283-291.
- Kazantsev, S.V. and Perkovsky, E.E. 2014. A new *Malthodes* and some other interesting soldier beetles (Coleoptera: Cantharidae) from Late Eocene Rovno amber. *Russian Entomological Journal*, 23(2):113-116.
- Kuška, A. 1996. New beetle species (Coleoptera: Cantharidae, Curculionidae) from the Baltic amber. *Prace Muzeum Ziemi*, 44:13-18.
- Kuška, A. and Kania, I. 2010. New soldier beetles (Coleoptera, Cantharidae) from the Eocene Baltic amber. *Zootaxa*, 2400:49-56.
- Linnaeus, C. 1758. *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Edition 10*. Laurentii Salvii, Holmiae. <https://doi.org/10.5962/bhl.title.542>
- Ross, A.J. 2018. Burmese (Myanmar) amber taxa, on-line checklist v.2018.1. [https://www.researchgate.net/publication/327403117\\_Burmese\\_Myanmar\\_amber\\_taxa\\_on-line\\_checklist\\_v20182](https://www.researchgate.net/publication/327403117_Burmese_Myanmar_amber_taxa_on-line_checklist_v20182).
- Schaufuss, C.F.C. 1892. Preussens Bernstein-Käfer. Neue Formen aus der Helm'schen Sammlung im Danziger Provinzialmuseum. *Berliner Entomologische Zeitschrift*, 36(1) [1891]:53-64. <https://doi.org/10.1002/mmnd.18910360111>
- Solier, A.J.J. 1849. Orden III. Coleoptera, pp. 105-511. In Gay, C. (ed.), *Historia Física y Política de Chile Segun Documentos Adquiridos en esta Republica Durante Doce Años de Residencia en Ella y Publicada Bajo los Auspicios del Supremo Gobierno. Tomo Cuarto. Zoología (Coleoptera: Pentamera - Heteromera L, exl. Cleroideos)*. Museo de Historia Natural de Santiago, Paris-Santiago. <https://doi.org/10.5962/bhl.title.79392>

## APPENDIX 1.

**A key to the species of *Cacomorphocerus***

- (1) Antennae strongly modified with antennomeres 3–9 saucer-shaped .....2
  - Antennae slightly modified with antennomeres 6–7 dilated ..... *C. eocenicus* sp. nov.
- (2) Pronotum with impression or incision .....3
  - Pronotum without impressions and incisions .....4
- (3) Pronotum with longitudinal impression ..... *C. cerambyx*
  - Pronotum with deep transversal and sinuous incision medially ..... *C. madseni*
- (4) Pronotum anteriorly rounded and protruding ..... *C. bentifabrici*
  - Pronotum not anteriorly protruding .....5
- (5) Pronotum rectangular with two oblong tubercles on disc ..... *C. jantaricus*
  - Pronotum sub-rectangular without tubercles on disc ..... *C. wisznievskii*