Studies and Reports
Taxonomical Series 20 (2): 315-322, 2024

A new Eocene species of *Cacomorphocerus* from Baltic amber (Coleoptera: Cantharidae: Cantharinae: Cacomorphocerini)

Fabrizio FANTI

independent researcher, Tuscany, Italy
e-mail: fantifab@alice.it

Taxonomy, new species, paleoentomology, Coleoptera, Cantharidae, *Cacomorphocerus,* Eocene amber, Russia

Abstract. Eocene Baltic amber: a new species of soldier beetle (Family Cantharidae) of the tribe Cacomorphocerini Fanti & Kupryjanowicz, 2018 named *Cacomorphocerus simkei* sp. nov., is described and illustrated in the present document. The new taxon is known from a male specimen discovered in the Yantarny mine, Kaliningrad region, Russia, and was compared with all the bibliography on the subject and all the known species.

INTRODUCTION

The Cacomorphocerini Fanti & Kupryjanowicz, 2018 are a tribe of the subfamily Cantharinae Imhoff, 1856 recently established and including 7 fossil genera and 24 species, all extinct (Kazantsev 2013, 2018; Fanti 2017a, 2022; Fanti & Kupryjanowicz 2018). The genus *Cacomorphocerus* Schaufuss, 1892 is the one with the most species within the tribe, which until now has 12 species from Baltic amber (Schaufuss 1892; Kuśka & Kania 2010; Fanti & Damgaard 2018; Fanti & Kupryianowicz 2018; Bukejs et al. 2019; Fanti & M. K. Pankowski 2019; Poinar & Fanti 2019; Fanti & M. G. Pankowski 2020; Parisi & Fanti 2020; Wentzel et al. 2022; Fanti & Vitali 2023) and only one taxon from Rovno amber (Kazantsev & Perkovsky 2020). *Cacomorphocerus* and the entire tribe Cacomorphocerini appear to have originated, evolved and then become extinct in the Eocene (Bukejs et al. 2019), however the phylogenetic relationships are almost unknown. The genus is characterized by antennae with 11 or 12 antennomeres, often with the central ones saucer-shaped or modified (Bukejs et al. 2019, Poinar & Fanti 2019; Kazantsev & Perkovsky 2020), it seems closely phylogenetically related to the genus *Sucinorhagonycha* Kuśka, 1996 which shows 12 filiform antennomeres and claws without teeth and lobes (Kuśka 1996; Fanti & Pankowski 2019). The other genera of the tribe Cacomorphocerini have: 15 (*Electronycha* Kazantsev, 2013), 16 (*Sucinocantharis* Kuśka & Kania, 2010), 17 (*Eridanula* Fanti & Damgaard, 2018), 17 (*Michalskantharis* Fanti, 2017) and 19 (*Noergaardia* Fanti & Damgaard, 2018) antennomeres (Kuśka & Kania 2010; Kazantsev 2013, 2020; Fanti 2017b, 2022; Fanti & Damgaard 2018; Wentzel et al. 2022). In this document, a new species of *Cacomorphocerus* with slightly modified antennae from Eocene Baltic amber is described.

MATERIAL AND METHODS

The specimen is embedded in a Baltic amber piece from the Sambian Peninsula, Kaliningrad region, Russia. The piece was cut and polished to provide a better view of inclusion, then the photographs of the new taxon were taken by Aleksej Damzen (Vilnius, Lithuania) with a Canon EOS 70D camera and Canon MP-E 65mm macro lens. The plates were processed using a PhotoImpact Viewer SE program by the author of this paper. The holotype was acquired by Florian Simke and donated by him to Carsten Gröhn and the Center of Natural History (Centrum für Naturkunde - CeNak; formerly Geologisch-Paläontologisches Institut und Museum der Universität Hamburg [GPIH]), Hamburg, Germany, where it is currently preserved.

RESULTS

Family Cantharidae Imhoff, 1856
Subfamily Cantharinae Imhoff, 1856
Tribe †Cacomorphocerini Fanti & Kupryjanowicz, 2018
Genus †*Cacomorphocerus* Schaufuss, 1892

†*Cacomorphocerus simkei* sp. nov.
(Figs. 1-3)

Type locality. Amber mine near Yantarny settlement, Sambian Peninsula, Kaliningrad region, Russia.

Horizon. Middle Eocene (Lutetian) (47.8-41.2 Ma) to late Eocene (Priabonian) (37.8-33.9 Ma).

Type material. Holotype (♂): inclusion in Baltic amber, deposited under accession number GPIH 5218 (ex coll. Jonas Damzen: JDC-13015).

Description. Adult, winged. Male, based on the shape of the last abdominal segments. Body length: 3.9 mm; head: 0.3 mm; pronotum: 0.7 mm; elytra: 2.9 mm; antennae: 2.8 mm. Entirely dark-brown.

Head short and strongly transverse, approximately as large as pronotum, equipped with few and very long setae and without punctation. Eyes rounded, convex, prominent, inserted laterally to the head in the upper part, interocular dorsal distance about 2.9 times greater than eye diameter. Mandibles robust, falciform, apparently without tooth. Maxillary palps 4-segmented with the last palpomere robust, securiform. Labial palps 3-segmented. Antennae pubescent equipped with long setae, noticeably surpassing the basal half of elytra, not reaching the elytral apex, 12-segmented, slightly modified, inserted rather far to the eyes; scape elongated, club-shaped, enlarged from middle to apex; antennomere II short, almost globular, about 2.1 times shorter than scape; antennomere III robust, enlarged in the middle; antennomere IV less robust and shorter than third; antennomere V longer than fourth, shorter than third; antennomere VI similar to fourth; antennomere VII very robust, rather elongated, the longest compared with the previous ones; antennomere VIII less robust than previous

Fig. 1. *Cacomorphocerus simkei* sp. nov. in Baltic amber: Holotype: A- dorsal view; B- ventral view.

one, asymmetric, with a side irregular and concave in the large part; antennomere IX robust, the longest except scape and the last antennomere, similar to antennomere VII but less robust; antennomere X elongated, slightly shorter and thinner than previous one; antennomere XI elongated, thinner and slightly longer than previous one; antennomere XII elongated,

Fig. 2. *Cacomorphocerus simkei* sp. nov. in Baltic amber: Holotype: A- dorsal view (macro shot); B- ventral view (macro shot).

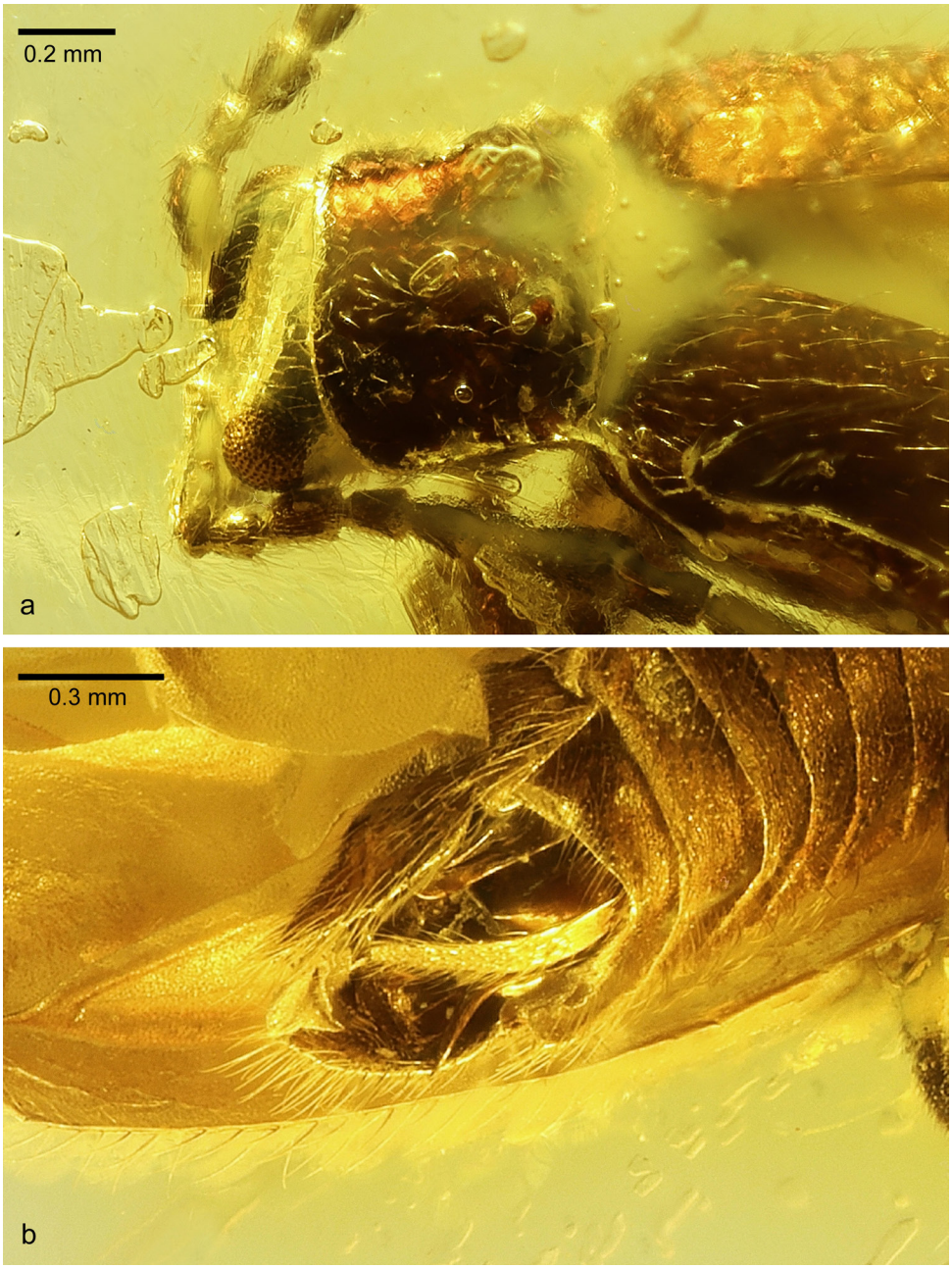

Fig. 3. *Cacomorphocerus simkei* sp. nov. in Baltic amber: Holotype: A- detail of head and pronotum; B- detail of last sternites.

filiform, rounded at apex. Pronotum rectangular, transverse, which partially cover the head, sides straight and evidently bordered, anterior and posterior margins straight and bordered, surface flat and equipped with few and very long setae and with extremely thin punctation. Scutellum triangular-shaped. Elytra long which noticeably surpasses the last abdominal segments, parallel sided, rounded at apex, wider than pronotum, surface feebly wrinkled and equipped with extremely long setae. Posterior wings semi-transparent / slightly infuscate, as long as elytra. Metasternum very robust, squared, pubescent, wrinkled, with posterior margin straight. Ventrites short, very narrow, strongly transverse and pubescent; last sternite extremely thin and extremely long, pubescent, curved, with apex slightly emarginate; two long and robust lobes, pubescent, which apparently begin at the posterior margin of the antepenultimate sternite; part of edeagus visible, with a shape difficult to understand. Legs slender, long and pubescent; coxae wide, rounded; trochanters elongated, with rounded apex; femora cylindrical, straight, sturdier than tibiae; tibiae slender, cylindrical, with an apical spur, pro- and mesotibiae approximately as long as pro- and mesofemora, metatibiae longer than metafemora. Tarsal formula 5-5-5; first tarsomere elongated; second shorter than first; third tarsomere shorter than second, apparently very slightly bilobed at sides; fourth tarsomere strongly bilobed, with lobes short and robust; fifth tarsomere thin, elongated, curved; claws simple with an obtuse / rounded tooth at base.

Systematic placement. Based on the last maxillary palps being securiform, elytra comparatively long, antennae 12-segmented and modified, and claws simple with tooth, the new species belongs in the genus *Cacomorphocerus* Schaufuss, 1892 (Fanti 2017a; Fanti & Kupryjanowicz 2018; Bukejs et al. 2019; Pankowski 2023; Pankowski & Fanti 2023).

Differential diagnosis. The new species is easily recognizable from other *Cacomorphocerus* due to its pronotum without lobes on the sides and without incision or impressions, associated with the antennae with only the antennomere VIII slightly modified (Fanti & Kupryjanowicz 2018; Bukejs et al. 2019; Kazantsev & Perkovsky 2020; Wentzel et al. 2022; Fanti & Vitali 2023). The new species is also easily recognizable by the last sternite extremely long and thin.

Etymology. Species named in honor of Florian Simke, future physicist, member of the "Arbeitskreis Bernstein" and amber enthusiast.

Syninclusions: Air bubbles and botanical remains.

Remarks. The yellow and rounded amber piece measures 27 × 19 × 3 mm. The inclusion is complete, however the legs are curled up and the right antenna has some white emulsion (German term: "Verlumung"). The female of the new taxon is unknown.

DISCUSSION

The study of the tribe Cacomorphocerini Fanti & Kupryjanowicz, 2018 having antennae with supernumerary and often modified antennomeres, can be very useful for biogeographical and phylogenetic reasons and also on the genesis and development of this intriguing characteristic, substantially unknown in other fossil and extant soldier beetles (Fanti & Pankowski 2019; Fanti 2023). The Cacomorphocerini appear to be a rather particular clade in the panorama of the entire family Cantharidae, and the genus *Cacomorphocerus* appears polyphyletic (Fanti & Pankowski 2020; Wentzel et al. 2022). The discovery of other species is desirable, in order to understand the reasons that led to its evolution and therefore better understand the evolutionary history of soldier beetles. For example, the close phylogenetic relationships with *Dysmorphocerus* Solier, 1849 (Cantharidae, Dysmorphocerinae Brancucci, 1980), a South American genus (Delkeskamp 1939, 1977; Brancucci 1980; Kazantsev 2013; Motyka et al. 2023), have been shown to be not real (Fanti & Kupryjanowicz 2018; Kazantsev 2018), and perhaps due to evolutionary convergence in adaptive response to an environmental force yet not known. The main characters of the Cacomorphocerini are in common with the subfamily Cantharinae, however the new species shows a significantly modified last sternite, similar to that of the genus *Malthodes* Kiesenwetter, 1852 (Cantharidae, Malthininae), demonstrating further uniqueness within this subfamily. Therefore, only new findings will shed light on this and many other interesting aspects.

ACKNOWLEDGMENTS. I am especially grateful to Jonas Damzen (Vilnius, Lithuania), Aleksej Damzen (Vilnius, Lithuania), Carsten Gröhn (Glinde, Germany) and Florian Simke (Greifswald, Germany), for giving me the opportunity to study this interesting fossil specimen.

REFERENCES

Brancucci M. 1980: Morphologie comparée, évolution et systématique des Cantharidae (Insecta: Coleoptera). *Entomologica Basiliensia* 5: 215-388.

Bukejs A., Fanti F. & McKellar R. C. 2019: A new species of *Cacomorphocerus* Schaufuss, 1892 (Coleoptera: Cantharidae) from Baltic amber with a key to known species. *Palaeontologia Electronica* 22.2.28A: 1-7.

Delkeskamp K. 1939: *Pars 165: Cantharidae.* In: Junk W. & Schenkling S. (eds): Coleopterorum Catalogus. W. Junk Verlag für Naturwissenschaften, 's-Gravenhage, 357 pp.

Delkeskamp K. 1977: *Pars 165 (I): Cantharidae. Coleopterorum Catalogus Supplementa.* Wilcox A. (Ed.), W. Junk bv. Publishers, The Hague, 485 pp.

Fanti F. 2017a: Catalogo Cantharidae fossili del mondo. *Fossils & Minerals Review* 2: 1-18 / World catalog of fossil Cantharidae. *Fossils & Minerals Review* 2(Special Issue): 1-52.

Fanti F. 2017b: New fossil Cantharidae genus and species from Baltic amber (Insecta Coleoptera). *Giornale Italiano di Entomologia* 14(62): 709-714.

Fanti F. 2022: Taxonomical notes on some fossil soldier beetles (Cantharidae). *Baltic Journal of Coleopterology* 22(2): 319-325.

Fanti F. 2023: A new fossil *Sucinorhagonycha* (Coleoptera: Cantharidae) from Baltic amber with visible female gonostyli. *Fossil Imprint* 79(2): 152-155.

Fanti F. & 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. & 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.

Fanti F. & Pankowski M. G. 2020: A new Eocene soldier beetle (Cantharidae) of the genus †*Cacomorphocerus* Schaufuss, 1892 from Baltic amber. *Zootaxa* 4869(3): 437-443.
Fanti F. & Pankowski M. K. 2019: A new soldier beetle of the extinct tribe Cacomorphocerini Fanti & Kupryjanowicz, 2018. *Zootaxa* 4651(3): 589-595.
Fanti F. & Vitali F. 2023: Two new taxa of fossil Cantharidae from Baltic amber. *Baltic Journal of Coleopterology* 23(2): 233-239.
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. 2018: New Baltic amber soldier beetles (Coleoptera, Cantharidae, Cantharinae). *Euroasian Entomological Journal* 17(2): 146-152.
Kazantsev S. V. 2020: New Baltic amber soldier beetles (Insecta: Coleoptera: Cantharidae) with some taxonomic notes. *Palaeoentomology* 3(3): 260-268.
Kazantsev S. V. & Perkovsky E. E. 2020: The first *Cacomorphocerus* species (Coleoptera, Cantharidae) from Rovno amber: a second species of the genus with 11-segmented antennae. *Zootaxa* 4751(2): 395-400.
Kuśka A. 1996: New beetle species (Coleoptera: Cantharidae, Curculionidae) from the Baltic amber. *Prace Muzeum Ziemi* 44: 13-18.
Kuśka A. & Kania I. 2010: New soldier beetles (Coleoptera, Cantharidae) from the Eocene Baltic amber. *Zootaxa* 2400: 49-56.
Motyka M., Kusy D., Biffi G., Geiser M. F., Kazantsev S. V., Bilkova R., Jahodarova E., Vogler A. P. & Bocák L. 2023: Untangling the evolution of soldier beetles (Coleoptera: Cantharidae) and the evaluation of the morphological phylogenetic signal in a soft-bodied elateroid lineage. *Cladistics* 39(6): 548-570 + Supporting Information.
Pankowski M. G. 2023: Two new species of soldier beetles (Coleoptera: Cantharidae) from Eocene Baltic amber, including one with a rare type of antennae. *Palaeoentomology* 6(4): 416-423.
Pankowski M. G. & Fanti F. 2023: Six new species of fossil soldier beetles (Coleoptera: Cantharidae) from Eocene Baltic amber. *Palaeoentomology* 6(3): 300-312.
Parisi F. & Fanti F. 2020: Baltic amber: A new *Cacomorphocerus* Schaufuss, 1892 with two specimens preserved in a single piece, and four new *Malthodes* Kiesenwetter, 1852. *Zootaxa* 4778(3): 546-560.
Poinar G. O. Jr. & Fanti F. 2019: A new fossil soldier beetle (Coleoptera: Cantharidae) of the genus *Cacomorphocerus* Schaufuss, 1892 from Baltic amber. *Palaeodiversity* 12(1): 99-105.
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.
Wentzel D., Bonino E. & Fanti F. 2022: A new *Cacomorphocerus* Schaufuss, 1892 (Cantharidae) from Baltic amber. *Baltic Journal of Coleopterology* 22(2): 313-318.

Received: 3.5.2024
Accepted: 10.6.2024
Printed: 5.10.2024