

***Eurocrossotus alekseevi* gen. n., sp. n. (Coleoptera: Cerambycidae) from Baltic amber, the first fossil member of the tribe Crossotini Thomson, 1864**

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Vitali F. 2021. *Eurocrossotus alekseevi* gen. n., sp. n. (Coleoptera: Cerambycidae) from Baltic amber, the first fossil member of the tribe Crossotini Thomson, 186. *Baltic J. Coleopterol.*, 21(2): 221 - 228.

A new fossil cerambycid, *Eurocrossotus alekseevi* gen. n., sp. n. (Lamiinae: Crossotini) is described based on one specimen preserved in Baltic amber. Morphological comparison is made with the extant Crossotini. Palaeogeographical remarks on the tribe Crossotini and biological remarks on the Lamiinae included in amber are added.

Key words: Lamiinae, succinite, systematics, palaeontology, new taxa

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INTRODUCTION

The tribe Crossotini Thomson, 1864 includes 72 genera and 397 species currently widespread in Asia and Africa (Roguet, 2004-2021). The tribe is defined by the following morphology: scape without dorsal ridge, mesotibiae without furrow, claws opposite, mesocoxal cavities open, mesepisterna normal, labium without hair fascicles, antennae not fossate (Lacordaire, 1869; Breuning, 1942a, b; 1950).

The first fossil species of Crossotini, moreover the only known European species of this tribe, is described here.

MATERIALS AND METHODS

The beetle is preserved inside a rectangular piece of amber measuring 30 x 15 x 5 mm with no other syninclusions.

Due to the cut of the amber, the beetle is missing part of the right antenna (except for the basal part of the scape and antennomeres VI-XI) and most of the left antenna (except for antennomeres I-III). The position did not allow further modifications by remodelling of the amber.

Observations on the fossil were made using a stereomicroscope Antares Geminar 3 with 20-40x eyepieces equipped with a micrometer system. The reconstruction of the habitus was obtained with mixed traditional and computer graphic techniques. Figures 1 to 3 were furnished by Jonas Demzen (Vilnius, Lithuania), seller of this amber; figure 4 was taken with a digital camera Nikon DX VR mounted on the stereomicroscope.

SYSTEMATIC PART

Cerambycidae Latreille, 1802
Lamiinae Latreille, 1825

Crossotini Thomson, 1864***Eurocrossotus* gen. n.****Differential diagnosis**

Eurocrossotus gen. n. shows all characters of Crossotini already stated in the introduction. In addition, it shows some characters not contemporaneously present in any extant genus: prosternal process narrow and lower than procoxae, frons parallel-sided, scape short, pronotum with a lateral tooth, elytra tapered posteriorly, without tubercles or hair fascicles but with long erect pubescence.

Most of these characters are present in the Malagasy genera *Lasiocercis* Waterhouse, 1882 and *Tlepolemoides* Breuning, 1957 and in the South African genera *Tlepolemus* Thomson, 1864 and *Paratlepolemoides* Breuning, 1962. Nonetheless, the prosternal process is wide in the first two genera (Breuning, 1957) and as high as procoxae in the third genus (Breuning, 1942a, b), while the antennae are not as fringed as in the fourth genus (Hunt & Breuning, 1959).

Eurocrossotus gen. n. also resembles some members of the Neotropical tribe Compsomatini Thomson, 1857, especially, *Eusphaerium* Newman 1838, the only genus covered with long pubescence, but which differs in the divergent claws (tribal character).

Description

Habitus minute, stout; everywhere covered with long dense pubescence.

Mandibles arcuate, without peculiar features; labium sub-trapezoidal, densely covered with recumbent pubescence; frons parallel-sided, convex, densely covered with fine punctures; eyes strongly reniform and finely facetted; lower eye lobes squared, as long as genae; vertex wide, marked with dense strong punctures.

Antennae almost thick, possibly a bit shorter than body (female), not fossate, internally fringed with

dense erect setae, one-half as long as the antennomere carrying it; scape short, club-shaped, everywhere covered with long erect pubescence; pedicel elongate, antennomere III bowed, slightly longer than scape; VII-X subequal, feebly decreasing in length apically; XI straight, scarcely longer than X; antennomere proportions according to the formula: 3.6: 1: 4.6: ? : ? : 2.6: 2.4: 2.3: 2.0: 1.8: 2.

Pronotum feebly transverse, 1.3 times as wide as long, finely furrowed at both apical and basal margin, armed with an obtuse large conical tooth at each side, which are connected on the disc with two large obtuse bulges delimiting a arcuate impression at apex and at base; surface sparsely covered with strong punctures. Scutellum widely semicircular, transverse, 2.5 times as wide as long.

Elytra short (each elytron about 3 times as long as wide at base), dorsally flat, regularly tapered to the apex; humeri almost prominent; sides slightly convex; apices widely rounded; disk covered with long erect pubescence and a strong dense punctation, twice as strong as that on the pronotum, nearly subseriate at base and along the suture, sparse in the middle and extremely fine or lacking at the sides and on the apical third.

Legs relatively short covered with long erect pubescence; femora club-shaped; protibiae arcuate; meta- and mesotibiae straight; mesotibiae without pre-apical furrow; tarsi short; claws opposite.

Prosternal process narrow, lower than procoxae; mesocoxal cavities open; mesepisterna narrow; last visible urosternite posteriorly rounded.

Etymology

From *Euro-* and the genus name *Crossotus* in reference to the past distribution of this fossil species.

Type species

Eurocrossotus alekseevi sp. n. (monobasic).

***Eurocrossotus alekseevi* sp. n.**

(Figs. 2-5)

Holotype. Baltic amber, ex coll. J. Demzen n°5764, author's coll. FS72BS41.

Description

Female, body length 7 mm. Characters of the genus.

Etymology

This new species is dedicated to Vitali I. Alekseev (Kaliningrad, Russia), eminent specialist in fossil beetles, for his significant contribution to the knowledge of the Baltic amber fauna.

Assumed biology

Though the knowledge of the biology of the African Cerambycoidea is still insufficient, Sudre & Téocchi (2003) provided a list of the sub-Saharan cerambycids related to conifers. Crossotini are represented by two species: *Corus collaris* (Chevrolat, 1856) and *Frea nyassana* Aurivillius, 1914, both reared from pines. Thus, the possibility that *Eurocrossotus alekseevi* sp. n. bored on *Pinus succinifera* (Conw.) or other conifers producing amber cannot be excluded.

Remarks on the tribe Crossotini and the systematic position of *Eurocrossotus* gen. n.

Crossotini shows some relationship to Ceroplesini Thomson, 1860, including the geographical distribution. The tribes basically differ in the fossate antennae, which characterise Ceroplesini and are simple in the more archaic Crossotini (Lacordaire, 1869; Breuning, 1937, 1942a, b, 1950).

Ignoring this peculiarity, Sama (2008) merged these tribes observing that *Crossotus* and *Ceroplesis* share an internal septum dividing the last abdominal segment. Nonetheless, the same character is also shared by other unrelated genera (*Idactus* Pascoe, 1864; *Pogonocherus* Dejean, 1821; *Sophronica* Blanchard, 1845; *Exocentrus* Dejean, 1835), which the author abstained to merge together.

On the other side, a molecular phylogenetic analysis of Lamiinae (Souza et al., 2020) based on two species of Crossotini (*Crossotus* and *Moechotypa*) and one of Ceroplesini (*Ceroplesis*) confirmed the close relation between these genera but did not decisively provide results concerning their monophyly (maximum likelihood 50-64%). Moreover, this analysis is also questioned by the presence of two "Ceroplesini sp." from Benin, whose identity and traditional tribe was not stated.

Further molecular analyses focusing on more members of both tribes could clarify this topic; however, while the internal septum dividing the last abdominal segment is a homoplasy (thus, insufficient to merge tribes), the fossate antennae seem to be an autapomorphy, sufficient to define separated tribes. In conclusion, the tribe Crossotini is temporarily accepted in its original meaning (Lacordaire, 1869; Breuning, 1942a, b, 1950; Roguet, 2004-2021; Sudre & Vitali, 2021).

Based on the characters shown by the most archaic tribe Pteropliini Thomson, 1860 and the Congolese genus *Cincinnati* Jordan 1894 (Crossotini), *Eurocrossotus* gen. n. shows both archaic (prosternal process narrow and lower than procoxae, frons parallel-sided, scape short, elytra without tubercles or hair fascicles) and derivate characters (pronotum with lateral teeth, elytra tapered posteriorly, with long erect pubescence). The fact that genera similar to *Eurocrossotus* gen. n. are currently present in Madagascar, known patria for some relict systematic groups, e.g., the lemurs, confirms the systematic position of this fossil. Accordingly, the presence of archaic taxa in both Baltic amber and the Southern Hemisphere has been noted for several other taxa (Wheeler, 1915; Henning, 1964, 1965, 1966, 1967; Baroni Urbani, 2000; Vitali, 2009; 2011; 2016).

Exactly as for lemurs (Vaughan et al., 2011), these Malagasy Crossotini are not the most ancient taxa of the tribe but they descend from other more primitive taxa living in Africa.



Fig. 1. *Eurocrossotus alekseevi* sp. n., lateral-ventral view.



Fig. 2. *Eurocrossotus alekseevi* sp. n., lateral-dorsal view.

Moreover, as for Dorcasominae (Vitali, 2016), the current distribution of Crossotini (absent in Australia and America) implies that this tribe evolved in Gondwana after its separation from these continents during Lower Cretaceous. These observations support some observations.

First, Crossotini evolved after the Lower Cretaceous and before the Baltic amber period (Eocene–Oligocene). Since lemurs dispersed to Madagascar between 47 and 54 Ma (Vaughan et al., 2011), it is possible that Crossotini appeared just after the Cretaceous–Paleogene mass extinction (65 Ma).



Fig. 3. *Eurocrossotus alekseevi* sp. n., dorsal view

Second, relatively specialised taxa were already widespread, at least, at both margins of Gondwana during the Eocene.

Third, the presence of Crossotini in Madagascar and Baltic amber implies a dependency on climates fresher than those of Equatorial Africa, such it is logical to expect for the fossil Baltic fauna.

However, differently from most species observed and described until now from Baltic amber, *Eurocrossotus* sp. n. is another example of a cerambycid of clearly subtropical origins. Its habitat and origins possibly corresponded to that of *Moechotypa diphysis* (Pascoe, 1871), the only Crossotini present in the Palaearctic region. This species, whose congeners are widespread in tropical south-western Asia, is associated with oaks and widespread from the Primorsky Krai, Far East Russia, to Chekiang, South-east China (Gressitt, 1951).

Some analogies can be also found with the fossil *Procleomenes gouverneuri* Vitali,



Fig. 4. *Eurocrossotus alekseevi* sp. n., detail of the head

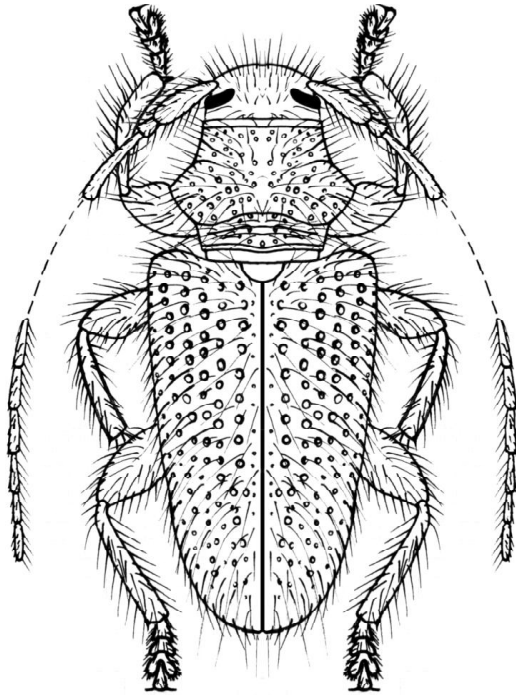


Fig. 5. *Eurocrossotus alekseevi* sp. n., reconstruction

2018, whose extant congeners are however assumed to be of Indochinese origin (Vitali, 2018).

Remarks on the Lamiinae in Baltic amber

Lamiinae are rarely described or even recorded from Baltic amber. Klebs (1910) did not record Lamiinae among his 40 pieces and, including *Eurocrossotus alekseevi* sp. n., only 5 of 29 cerambycid species described from Baltic amber belong to Lamiinae.

Except for *Pogonocherus jaekeli* Zang, 1905, the systematic position of other species seems uncertain and needs revision (Vitali, 2009); nonetheless, this value (~17%) seems extremely low since the Lamiinae are about the half of all described cerambycid species. They are prevalent in tropical regions, *e.g.*, being ~71% of all Cerambycoidea in India (Kariyanna et al., 2017, 2019), while they reach ~36% in the West Palaearctic region (Vitali & Schmitt, 2016).

This seemingly underrepresentation in Baltic amber may be due to at least two different reasons.

Firstly, Lamiinae are normally little represented in coniferous forests. In fact, only ~11% of all West Palaearctic Cerambycoidea bore conifers and only 2.4% are Lamiinae (Vitali & Schmitt, 2016). In warm and humid mixed forests, this rate is also lower due to the relative scarcity of conifers. For example, though the list is far from exhaustive, Gressitt (1970) mentioned only four Laotian species living on conifers and none belonging to Lamiinae. Thus, though Baltic ambrosia also attracted feeders on broad-leaved trees or even aquatic beetles, the total number of Lamiinae in ancient Baltic mixed forests should be naturally limited.

Secondly, Lamiinae may be less attracted by fluent ambrosia. This hypothesis might be confirmed by the fact that Lamiinae are also less abundant in Dominican amber. Here, only 3 of 11 (~27%) described species belong to Lamiinae (Vitali, 2020), while they represent ~38% of the extant species (Tavakilian & Chevillotte, 2021).

Hence, in reality, the rate of Lamiinae in Baltic amber is not low at all.

ACKNOWLEDGEMENTS

I am grateful to the kindness of Vitali I. Alekseev (Kaliningrad, Russia) for providing awareness to the existence of this amber, to the generosity of my beloved wife Otilia, for having made the acquisition, to the expert knowledge of Jérôme Sudre (Montpellier, France) for his beneficial observations and the necessary literature, and to the availability of Daniel Heffern (Houston, Texas, USA) for his valuable linguistic revision of the text.

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Received: 21.09.2021

Accepted: 21.12.2021

Published: 30.12.2021