

Short communication

The extant genus *Eutheia* (Coleoptera: Staphylinidae: Scydmaeninae) discovered in Upper Cretaceous Taimyr amber

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ABSTRACT

The Eutheini includes over 90 extant species classified in seven genera and distributed predominantly in the Northern Hemisphere. So far only one extinct genus and species unambiguously placed in this tribe has been known, *Archeutheia*, from Albian of Spain. We report the discovery of *Eutheia*, a member of the largest extant genus of Eutheini, in Santonian of northern Siberia. Extant species of *Eutheia* are primarily defined on the basis of male genital characters, and the specimen discovered in Taimyr amber is a female; consequently it is described as *Eutheia* sp. The new finding remarkably extends the known range of Eutheini during Cretaceous over the area of about 6 thousand kilometers, from the Iberian Plate to northern Siberia. A long morphological stasis in *Eutheia* suggests that this genus was associated with stable mesic microhabitats of the upper soil layers or rotten wood for at least 83 my.

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1. Introduction

Eutheini is a relatively small tribe of morphologically conspicuous Scydmaeninae, or ant-like stone beetles. It comprises over 90 extant species in seven genera distributed on all continents (Jałoszyński, 2014a). This is predominantly a Northern Hemisphere group, with only one genus, *Paraneseuthia* Franz, 1986, known to occur also south of equator. Moreover, the majority of species belong to two genera, *Eutheia* Stephens, 1830 and *Veraphis* Casey, 1897, both distributed mostly in the Holarctic region (Newton & Franz, 1998; Jałoszyński, 2014a). Species of Eutheini are minute (typically 0.7–2 mm), elongate and flattened; only *Paraneseuthia* and *Euthiconus* Reitter, 1881 include strongly convex beetles. Very little is known about biology of Eutheini; these are rare scydmaenines usually collected by sifting surface layers of forest leaf litter or rotten wood, and infrequently also by flight intercept traps. Despite the rarity, Eutheini is one of the best studied tribes of Scydmaeninae. Morphological structures of all genera were

described and illustrated in detail (Jałoszyński, 2010a, 2011, 2014a), the tribe was a subject of a phylogenetic analysis which resulted in placing it within Cephenniitae, Reitter, 1882, as a sister group of a clade composed of Cephenniini, Reitter, 1882 and Marcepaniini Jałoszyński, 2014a (Jałoszyński, 2014a), and although only one extinct taxon is known, it also was included in a phylogenetic analysis and its placement in Eutheini is well-supported (Jałoszyński & Peris, 2016).

Schaufuss (1890) described two new genera, each including one species, from the upper Eocene Baltic amber, and suggested that they were similar to the extant *Eutheia*. These are *Hetereuthia* Schaufuss, 1890 and *Palaeothia* Schaufuss, 1890. However, the descriptions are vague and lack details that could be used to confirm the placement within Eutheini. Schaufuss' paper is not illustrated, and the current depository of his type specimens remains unknown. In the world catalog of the genera of Scydmaeninae (Newton & Franz, 1998) *Hetereuthia* and *Palaeothia* are listed as *incertae sedis*, and this view seems most reasonable at the current stage of knowledge. Consequently, the only species known in a fossil form and unambiguously placed in Eutheini is *Archeutheia magnifica* (Peris, Chatzimanolis and Delclòs, 2014) from the lower Albian of Spain. This species was originally placed in *Kachinus* Chatzimanolis, Engel and Newton, 2010, genus described from the Upper Cretaceous Burmese amber and treated as *incertae sedis* within Scydmaenitae. Jałoszyński and Peris (2016) re-examined the

Abbreviations: PIN, Paleontological Institute of the Russian Academy of Sciences, Moscow; SIZK, Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine, Kiev.

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type material, incorporated characters of *K. magnificus* in a phylogenetic analysis and concluded that this species should be placed in Eutheini, as a sister group of *Eutheia*. It was therefore demonstrated for the first time that Eutheini is an old group whose members, morphologically very similar to the extant *Eutheia*, were present on the Iberian Plate over 105 Ma.

In the present study we report a discovery of Eutheini in the Upper Cretaceous amber of Taimyr Peninsula. This finding is the oldest definite *Eutheia* known so far, and represents the first member of the Staphylinidae determined to the generic level from the Taimyr amber.

2. Geographic and geological context

The specimen used in this study comes from Yantardakh, situated at the base of Taimyr Peninsula, northern Siberia (Fig. 1). The locality is a cliff on the right bank of the Maimecha River, three km upstream from its confluence with the Kheta River (Yantardakh Hill, about 200 m long and 30 m high; 71°18'26.54"N 99°33'46.51"E). The amber piece was collected in 2012 during a PIN expedition by D. S. Kopylov, E. A. Sidorchuk and D. D. Vorontsov, near the water level (Fig. 3 in Rasnitsyn et al., 2016).

The amber at Yantardakh is deposited in the Kheta Formation of Coniacian-Santonian age (Saks et al., 1959). All amber in Yantardakh comes from the upper horizons of the formation, and is consequently thought to be Santonian (Zherikhin, 1978) or even upper Santonian, based on the presence of marine bivalves of the genus *Inoceramus* Sowerby, 1814 (Praecardioida: Inoceramidae) in the overlying (upper Santonian-lower Campanian) Mutino formation (Saks et al., 1959; Zherikhin & Sukacheva, 1973; Zherikhin & Eskov, 1999). The Mutino Formation conformably overlays the amber-bearing horizon without visible breaks (Rasnitsyn, 1980). Geological and palaeontological data concerning the Kheta formation and Yantardakh were recently summarized by Rasnitsyn et al. (2016); the available biostratigraphic evidence indicates the late Santonian age of the horizon.

A warm-temperate, humid climate was reconstructed for the Mutino and Turonian/Coniacian Ledianaya formations that overlay and underlay the Kheta Formation, respectively (Golovneva, 2012). Inclusions of Taimyr Santonian localities are hypothesized to have been rapidly buried in deltaic sediments and reflect the fauna that inhabited an area directly adjacent to the river bank (Zherikhin & Sinitshenkova, 2002).

3. Material and methods

The fossil specimen here described is housed in the Paleontological Institute of the Russian Academy of Sciences (PIN) and was assigned a collection number 3311/1086. The inclusion is in a polished flat pentagonal piece of retinite 4.35 × 3.8 × 0.65 mm; it was observed under a Leica stereomicroscope M165C in the center of the collective usage of the scientific equipment 'Animalia' (SIZK). Photographs were taken using a Leica DFC 425 digital camera mounted to a Leica M165 microscope in PIN. Images were edited with Corel PhotoPaint 9.397. Morphological structures were figured by freehand drawing, with exact proportions and general shapes sketched from photographs. Measurement convention and the terminology of morphological structures follow those of Jałoszyński (2011, 2014a). The map in Fig. 1 is based on that published previously by Perkovsky and Makarkin (2015).

4. Systematic palaeontology

Suborder Polyphaga Emery, 1886

Superfamily Staphylinoidea Latreille, 1802

Family Staphylinidae Latreille, 1802

Subfamily Scydmaeninae Leach, 1815

Tribe Eutheini Casey, 1897

Genus *Eutheia* Stephens, 1830

Remarks. The specimen is unambiguously placed in Eutheini on the basis of the following synapomorphies (Jałoszyński, 2014a): the body only weakly constricted between the head and pronotum and between pronotum and elytra; the head prognathous, lacking deep occipital constriction, maxillary palp (Fig. 2 D; *mxp*) with palpomere 4 short and broad, with blunt apex; prothorax with sharp lateral edges, complete notosternal sutures (Fig. 2D; *nss*) and long basisternal part of prosternum (Fig. 2D; *bst*); mesanepisterna (Fig. 2D; *aest2*) and mesepimera (Fig. 2D; *epm2*) exposed in ventral view; and broadly separated metacoxae. The taxon is unambiguously identified as belonging to the branch of Eutheini comprised of *Veraphis*, *Eutheia* and *Archeutheia* (Jałoszyński & Peris, 2016) on the basis of strongly elongate, slender and flattened body; sub-triangular intercoxal area; weakly elevated mesoventral intercoxal process (Fig. 2D; *msvp*); and truncated elytral apices that leave the pygidium and propygidium (Fig. 2B; *pg*, *ppg*) exposed. The specimen has the mesoventral intercoxal process broad and

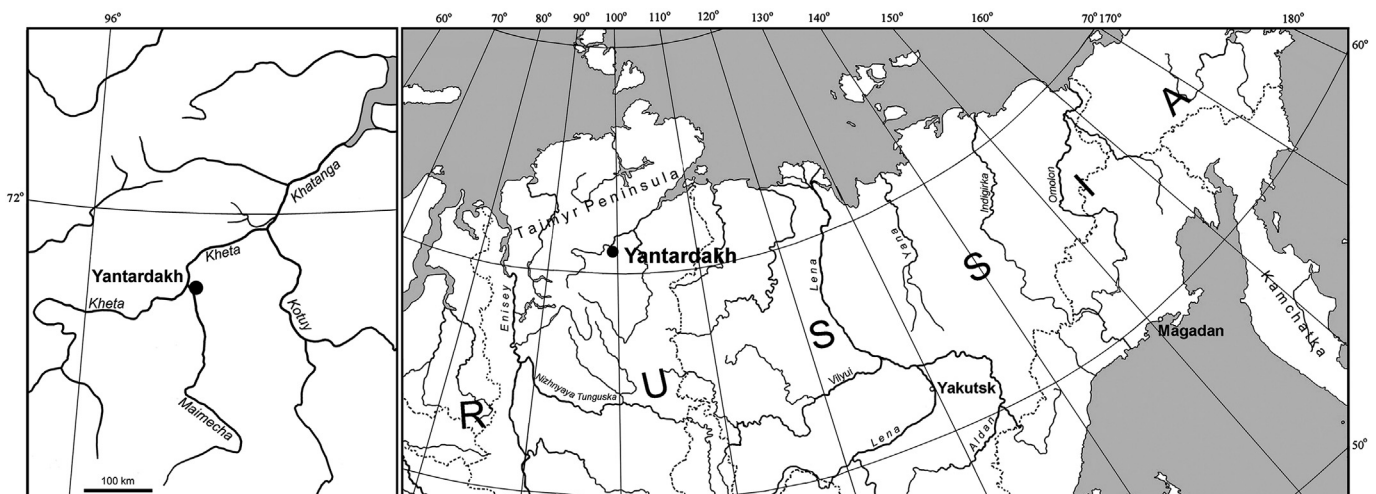


Fig. 1. The location of Santonian amber deposits of Yantardakh in Taimyr Peninsula, northern Siberia.

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