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A new genus and species of cockroach (Blattida: Phyloblattidae) from the Permian/Triassic boundary beds of Tunguska Basin in eastern Siberia, Russia

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Abstract

Macroscopic fossils of terrestrial animals originating directly from deposits close to the Permian/Triassic boundary are very scarce. Volcanic ash sediments in Eastern Siberia were found to hold the cockroach *Sobytie tungusicum* **gen. et sp. n.** This new taxon belongs to the predominantly Palaeozoic family Phyloblattidae, but has many advanced features characteristic of the Mesozoic family Caloblattinidae, and also of the basal Liberiblattinidae. These connections provide an indication of the origin of the family Liberiblattinidae and thus all the Mesozoic cockroach lineages from such Phyloblattidae – precursors of the Caloblattinidae.

Key words: fossil insects, Palaeozoic cockroach, Permian/Triassic boundary event, Phyloblattidae

Introduction

The Permian/Triassic boundary event belongs to the five major extinctions in the history of Earth, and is one of the most studied time intervals in geology (see Benton 2003). The transition of insects through the boundary is well studied as well (Shcherbakov 2008a, b). Indeed, in contrast to the numerous Middle Permian extinctions of Palaeozoic cockroach families, the Permian-Triassic transition itself was not that dramatic for cockroaches. However, only the families Phyloblattidae, Spiloblattinidae and Subioblattidae were able to cross the boundary, and only Phyloblattidae and Caloblattinidae have also been found in the near-boundary interval. The family-level taxonomic diversity of the Early Triassic roaches, consisting of the three mentioned families, was the lowest in the history of the order (Vršanský 2003), even though the general recovery of insect faunas in the end of Early Triassic was rapid due to decline of volcanic activity (Payne and Kump 2007, Shcherbakov 2008a, 2009).

Insects coming directly from the boundary beds are extremely valuable. The present locality represents intertrappean volcanoclastic deposits of the Bugarikta Formation. The age of these beds is disputable: many paleontologists date them earliest Triassic, or late Early Triassic (point of view adopted in the regional stratigraphic scale; Mogutcheva and Krugovykh 2009), while others argue for terminal Permian (Sadovnikov 2008). However, these beds might correspond to the so-called boundary beds (an interval between the former, ammonite-based and current, conodont-based Permian/Triassic Boundary (PTB) (D. Shcherbakov pers. comm.. 2009) and belong to the terminal Lopingian Permian (Changhsingian) according to the International Stratigraphic Scale (see also Menning et al. 2006). This formation has yielded megaflora, spores and pollen, Conchostraca, Ostracoda, insects, fishes (Sytchevskaya 1999) and amphibians (Werneburg 2009). Several insect specimens were collected from the Bugarikta-1 locality: *Praelocustopsis mirabilis* Sharov, 1968 (Orthoptera, Locustavidae – first occurrence of the family: Gorochov 2005), two wings of Archescytinidae (Homoptera – last occurrence of the family: Shcherbakov 2000), two wings of unidentified Mecoptera, and three specimens of beetles belonging to Schizophoroidea (A.G. Ponomarenko, pers. comm. 2009).

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