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Phyloblatta grimaldii sp.nov. – a new Triassic cockroach (Insecta: Blattaria) from Virginia

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VRŠANSKÝ, P. 2003. Phyloblatta grimaldii sp.nov. – a new Triassic cockroach (Insecta: Blattaria) from Virginia. *Entomol. Probl.* 33(1–2): 51–53. – A new species is described from the Upper Triassic deposits of Virginia, USA. The species represents the latest significant record of the Palaeozoic family Phyloblattidae, ancestral to all the known living roaches (through Caloblattinidae-Mesoblattinidae and Caloblattinidae-Liberiblattinidae lineages).

Key words: Blattaria, new species, Phyloblattidae, Triassic, new taxa, systematics, fossil.

Introduction

The Triassic period is characterized by the transition of the Paleozoic biota toward the more progressive, Mesozoic one. The Virginia record is peculiar for Tanytrachelos, a tanystropheid reptile with soft tissues preserved, and well preserved plant remains of ferns, cycadeoids, and conifers. Ginkgophytes and benettitales are represented in the best preservation state. The most abundant insects are water bugs, Belostomatidae and Naucoridae, and auchenorrhynchas. Also a thrip, a psychodoid and some other dipterans are represented in sediments (FRASER et al. 1996).

The Triassic period represents a considerable gap in the Blattaria record. Unlike the Palaeozoic and other Mesozoic (except some Jurassic) localities, many Triassic sites are free of Blattaria, or blattids are not dominant.

A perfectly preserved specimen now under description allows it to be appreciated as a represntative of the Phyloblattidae, a predominantly Paleozoic family. The major importance is that the Caloblattinidae Vrsansky et Ansorge, 2000 – descendants of Phyloblattidae – are the stem group (through the Mesoblattinidae HANDLIRSCH, 1906 and Liberiblattinidae VRŠANSKÝ, 2002) for all contemporary roach, mantid, and termite lineages (VRŠANSKÝ 1999a,b, 2002; VRŠANSKÝ et al., 2002). Also it shows that the sophisticated coloration of pronotum, typical for more advanced groups, was already present in this archaic family.

Material and methods

The single specimen originated in the Triassic (Carnian Cow Branch Formation) of Virginia, U.S.A. The sediments have been interpreted as a meromictic lake with a well oxygenated epilimnion but an anoxic hypolimnion. (OLSEN 1989, as cited in FRASER et al. 1996).

The imprint fossil can be seen as a pale reflection at a particular illumination angle or black on a gray background under polarised illumination. The main veins of both forewings, legs, outlines, and coloration of the pronotum are visible.

Results

Phyloblattidae SCHNEIDER, 1983
Phyloblatta HANDLIRSCH, 1906

***Phyloblatta grimaldii* gen. et sp.nov.**
(Figs 1–2)

Undescribed Phyloblattidae: VRŠANSKÝ et. al., 2002: fig. 368.

Holotype. AMNH. Upper Triassic of Virginia, USA. Newark Supergroup.

Diagnosis. (Figs 1–2) Head hypognathous. Pronotum ovoid, transversal, with distinct and sophisticated coloration (with symmetrical pictures). Two pale dots are apparent in the dark strip of the hind margin.

Forewing with total number of veins about 50–55, including anal veins (due to the preservation state of the holotype, it is not possible to restore the number of veins more precisely). Sc regularly branched (with at least four branches); R not differentiated, with 15–20 veins; M richly branched (with 5–10 veins); Cu ending in the posterior margin of the wing, anteriormost vein slightly S-shaped, pectinate with about 6 main branches. Clavus distinct, with about 12 anal veins at the margin (A2 secondarily branched); anal kink present.

Legs cursorial, with fore and mid tibiae unusually short. Strong spurs present at all tibiae.

Remarks. The new species is closely related to *P.*

flabellata (GERMAR, 1842) (type A) from the Permian (Rotliegende) of Svitavka (Boskovice, Czech Republic), but has less branched Sc. Both species share all other forewing characters.

Etymology: named after Dr. David Grimaldi.

Discussion

Species is the only representative of Paleozoic families with such an intricately colored pronotum (common in Mesozoic Blattulidae, Mesoblattinidae, Caloblattinidae). According to the absence of such coloration in rich Paleozoic material, it is probable that such sophisticated coloration pattern evolved only in the latest Paleozoic or earliest Mesozoic. The striated coloration of the pronotum is present in the Spiloblattinidae (SCHNEIDER 1977; SCHNEIDER & WERNEBURG 1993). Such complicated coloration may require a very competent melanine control.

The Phyloblattidae are the most generalized roach family, representing single family that crossed the Paleozoic-Mesozoic boundary with connection to the modern fauna. However, after the Caloblattinidae evolved, their role in the ecosystems declined; and a single species is known from the Lower Jurassic of Fergana (see below).

Phyloblatta is a common roach genus in the Permian of Europe, Asia and South America (SCHNEIDER 1980; PINTO & PURPER 1979).

PAPIER & GRAUVOGEL-STAMM (1995) mention 57 roach species in the Triassic and at least 20 additional undescribed species are known from the Russian sites (Madygen Formation etc.).

Keuperoblatta thuringica MÜLLER, 1965 described from the Triassic of Thüringen in Germany also belong to Phyloblattidae (not Mesoblattinidae as originally described by MÜLLER, 1965), but the locality is dominated by Caloblattinidae (MÜLLER 1965; GEYER & KELBER, 1987).

The Triassic period is dominated by the Caloblattinidae in Eurasia (including Japan; hindwing of *Saldyoblattina kimurai* FUJIYAMA, 1973 from the Upper Triassic Momonoki Formation belongs to Caloblattinidae and not to Archimylacrididae, as suggested by FUJIYAMA 1973), and also in South America (PINTO & ORNELLAS 1974) and Australia (TILLYARD 1919). *Triassoblatta*, a dominant genus here, was classified as Poroblattinidae by DODDS (1949). However, all species there except for the type species *T. typica* TILLYARD, 1919, belong to the Caloblattinidae.

The Permian-Triassic transition was rather dramatic for cockroaches – only the Phyloblattidae, Spiloblattinidae, Poroblattinidae, and Subioblattidae were able to cross it. The family-level taxonomic diversity of the Lower Triassic roaches was the lowest in the history of the order.

The Lower Jurassic *Kisylblatta unifasciata* from Kyzyl-Kiya in Fergana (MARTYNOV 1937) is probably the last representative of the Phyloblattidae (and not Archimylacrididae).

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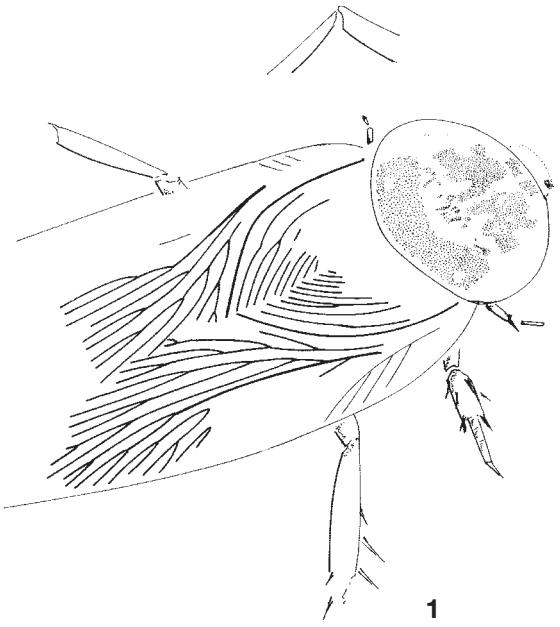

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Figs 1–2. *Phyloblatta colorinota*. Holotype. Upper Triassic of Virginia, USA. Newark Supergroup.

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