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New Fulgoridiidae genus from Upper Jurassic Karatau deposits, Kazakhstan (Hemiptera: Fulgoromorpha: Fulgoroidea)

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Abstract

Aulieezidium karatauense, a new genus and species of the extinct planthopper family Fulgoridiidae is described from the Upper Jurassic deposits of Karabastau Formation of Aulie, Karatau (Southern Kazakhstan Province, Kazakhstan). The characters of the new genus in respect to other genera placed in Fulgoridiidae are reviewed. The palaeoecological and palaeogeographical data concerning *Aulieezidium* gen. n. and other genera of Fulgoridiidae are also discussed.

Key words: *Aulieezidium* **gen. n.**, *Aulieezidium karatauense* **sp. n.**, taxonomy, phylogeny

Introduction

The hemipteran suborder Fulgoromorpha is a very old and highly diverse suborder of the Hemiptera. It comprises three superfamilies: Permian Coleoscytoidea Martynov, 1935 (Coleoscytidae Martynov, 1935), Permian and Triassic Surijokocixioidea Shcherbakov, 2000 (Surijokocixiidae Shcherbakov, 2000) and Fulgoroidea Latreille, 1807, known since the Jurassic. Over 20 families of Fulgoroidea, extinct and extant, are recognized (Szwedo *et al*. 2004; Bourgoin & Szwedo 2007, 2008, 2009). Extinct families of Fulgoroidea are: Jurassic Fulgoridiidae Handlirsch, 1906 and Cretaceous ones – Lalacidae Hamilton, 1990, Neazoniidae Szwedo, 2007, Perforissidae Shcherbakov, 2007 and Mimarachnidae Shcherbakov, 2007 (Hamilton 1990; Szwedo 2007, 2008, 2009; Shcherbakov 2007a, b). The monophyly, relationships, range and content of several families (both extant and extinct) is under discussion. The recently recognised extant Fulgoroidea families are: Achilidae Stål, 1866 + Achilixiidae Muir, 1923, Caliscelidae Amyot et Serville, 1843, Cixiidae Spinola, 1838, Delphacidae Leach, 1815, Derbidae Spinola, 1839, Dictyopharidae Spinola, 1838, Eurybrachidae Stål, 1862 + Gengidae Fennah, 1949, Flatidae Spinola, 1838 + Hypochthonellidae China et Fennah, 1952, Fulgoridae Latreille, 1807, Issidae Spinola, 1838 + Acanaloniidae Amyot et Serville, 1843, Kinnaridae Muir, 1925 + Meenoplidae Fieber, 1872, Lophopidae Stål, 1866, Nogodinidae Melichar, 1898, Ricaniidae Amyot et Serville, 1843, Tettigometridae Germar, 1821 and Tropiduchidae Stål, 1866. Despite a great interest in studying phylogenetic relationships of Fulgoroidea the taxonomy of this unit is still not stable. Morphology-based hypotheses had been presented by Asche (1988), Emeljanov (1990, 1999) and Bourgoin (1993). Several studies tested relative placement of particular families, e.g. Tettigometridae, Tropiduchidae, Caliscelidae or Achilixiidae (Bourgoin *et al*. 1997; Yeh *et al*. 1998; Liang 2002, Gnezdilov & Wilson 2006). Another attempt to present fulgoroid relationships (Bourgoin & Campbell 2002) is based on combined morphology, molecular sequences and palaeontological data. Some of the so called higher Fulgoroidea, e.g. subunits of the families Nogodinidae, Issidae and Tropiduchidae are related, but their relationships are unclear in respect to morphological, palaeontological and molecular data and interpretations, and the limits of the families are not strict. More recently, molecular phylogenetic studies of the recent Fulgoroidea were presented

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