Nedubroviidae, a new family of Mecoptera: the first Paleozoic long-proboscid scorpionflies

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Abstract
Nedubroviidae fam. nov. consists of Nedubrovia gen. nov., with Nedubrovia shcherbakovi sp. nov. as the type species, N. deformis sp. nov., and N. mostovskii comb. nov., originally described in Mesopanorpodes. The second genus of Nedubroviidae is Paranedubrovia gen. nov., with Paranedubrovia novokshonovi sp. nov. as the type species, and including P. minutissima sp. nov. Of these five species, all originate from the Late Permian of European Russia except for the Early Triassic N. mostovskii. The wing venation of these species indicates membership in the long-proboscid mecopteran clade Aneuretopsychina. The body structure of one species, N. shcherbakovi, includes a long proboscis consistent with fluid feeding on contemporaneous plants.

Key words: Mecoptera, Aneuretopsychina, new family, long-proboscid insects, Late Permian, Early Triassic, Russia

Introduction
Novokshonov et al. (2004) described a new species of Mesopanorpodes Tillyard 1918, M. mostovskii, based on two isolated forewings from the basal Triassic of Russia. The taxonomic attribution of these fossils to a genus of Permochoristinae (Permochoristidae) was based mainly on the following venational characters (fig. 2A): long SC with a single fore-branch, two-branched RS and MA with equally short forks, and four-branched MP (venational terminology is discussed below). However, the authors did not consider the nature of the junction between the CuA and MP veins of M. mostovskii, which are in fact fused for a distance, with M, being reduced, a feature not previously noted in Mesopanorpodes. Newly discovered mecopteran fossils from the Upper Permian, which undoubtedly are closely related to M. mostovskii, reveal additional features that question its systematic position. Particularly, some of the new species demonstrate CuA fused with MP very basally and for a long distance.

Fusion of CuA and MP is not characteristic of Permochoristidae, except for a few Permian and Mesozoic Mesochoristini (e.g. Baianochorista mongolica (Novokshonov 1997b) and often as individual deviations in some Permian species), as well as in some Mesozoic “paratrichopteran”-like forms (e.g. Choristopsyche tenuinervis Martynov 1937 (Novokshonov & Sukacheva 2001) and Mesageta spp. (Novokshonov 1997c)), whose relationship to Permochoristidae is doubtful. The MP+CuA fusion is still less expected in Mesopsychidae, in which Mesopanorpodes is a likely subordinate taxon (Bashkuev, in prep.). This family demonstrates a contrary tendency, with the CuA base shifted far distad to M₅, accompanied by an opposite change in branching angle. Finally, the new material reveals a rather complete specimen showing the hind wings and the head with elongated proboscis, a feature implying quite different taxonomic affinities of the group under consideration. This evidence indicates that the group in question forms a taxon of its own, which is established herein as Nedubroviidae fam. nov.

Material and methods
Described material was collected from four localities in the continental Permian-Triassic sequences of north-central European Russia (Fig. 1). The Isady locality is a lens of fluvio-lacustrine deposits within the Sukhona River.