

New archaeorthopteran insects from the Carboniferous of Poland: Insights into tangled taxonomy

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Archaeorthoptera is a high rank insect taxon comprising Orthoptera as well as the extinct orders Titanoptera and Caloneurodea, and several other late Paleozoic groups formerly assigned to polyphyletic Protorthoptera. Synapomorphies defining Archaeorthoptera and some fossil subordinate taxa are exclusively based on wing venation. This study presents a detailed description of two new archaeorthopteran genera and three new species from the Pennsylvanian of the Upper Silesian Coal Basin in Poland. These new taxa provide new insights into the wing venation disparity of this remarkable and insufficiently studied insect group. *Oмалиella polonica* sp. nov. is based on a well preserved forewing, including the wing base, which allows a thorough discussion and comparison with other archaeorthopterans. Surprisingly, it is the first complete wing for this group of related genera (*Oмалиella*, *Omalia*, *Coselia* and *Paleomastax*). *Owapteron dareki* gen. et sp. nov. has an unusual arrangement of cubital veins. The marked resemblance of the venation of *Owapteron* to that of some members of the gerarid line, such as *Nacekomia*, supports its placement within the family Geraridae (stemgroup Orthoptera). Finally, the venation of *Parapalaeomastax dariuszi* gen. et sp. nov. strikingly resembles that of the genus *Palaeomastax*, differing only in the distally branched media. Discovery of these three new archaeorthopterans from the Upper Silesian Coal Basin fits well with that of closely related taxa known from other deposits in Euramerica, such as Mazon Creek Lagerstätte, Avion in Pas-de-Calais Basin and others. Furthermore, a new re-examination of the earliest archaeorthopteran from the Upper Silesian Coal Basin confirms doubtful assignment of this fragmentary fossil to Archaeorthoptera or even to Pterygota.

Key words: Insecta, Archaeorthoptera, Polyneoptera, wing venation, Pennsylvanian, Poland, Upper Silesia.

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