

## Revision of the enigmatic insect family Anthracoptilidae enlightens the evolution of Palaeozoic stem-dictyopterans

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The position of the Palaeozoic Anthracoptilidae has been a major problem of insect systematics for over a century. The previous hypotheses suggested affinities of Anthracoptilidae with the Palaeodictyopteroida, Protorthoptera, Hypoperlida, stem-Mantodea, Paraneoptera, Holometabola, or Eoblattida. Herein we put forward a new hypothesis based mainly on a comprehensive re-evaluation of the wing venation characters and re-examination of the type material of *Anthracoptilus perrieri* and *Mesoptilus dolloi*. The Anthracoptilidae are considered as belonging to the paoliid lineage, sister group of the Dictyoptera. In particular this result refutes the presence of Mantodea in the Paleozoic fossil record. The two families Strephocladidae and Strephoneuridae, are considered as junior synonyms of the Anthracoptilidae, while the previous synonymy of the Anthracoptilidae with the Ischnoneuridae is rejected. We consider the Permarrhaphidae, previously considered as synonym of the Anthracoptilidae, (and *Permarrhaphus*) as Insecta incertae sedis. The following new taxa are proposed: *Mesoptilus carpenteri* sp. nov. from the early Permian of Wellington Formation in Oklahoma (USA) which extends the range and distribution of the genus; *Pseudomesoptilus* gen. nov. is designated to include *Mesoptilus sellardsi*; *Strephocladus permianus* sp. nov. from the middle Permian of South of France; *Westphaloptilus gallicus* gen. et sp. nov. from the Bashkirian of the North of France.

**Key words:** Insecta, Neoptera, Paoliida, systematics, Carboniferous, Permian, France, USA.

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