



New Palaeogene horntail wasps (Hymenoptera, Siricidae) and a discussion of their fossil record

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Abstract

The phylogenetic placement of siricid hymenopterans and especially the relationships among Siricidae are not resolved, and are in need of further investigation. The fossil record helps to illuminate the evolutionary history of this group. In this paper, *Xoanon? eocenicus* sp. nov. is newly described from the Eocene Fossilagerstätte Grube Messel (Germany). Although several characters of the wing venation of this fossil are similar to the extant genus *Xoanon*, there remain some doubts concerning the generic placement. A newly found fossil is attributed to *Urocerus ligniticus* (Piton, 1940) from the Palaeocene Fossilagerstätte Menat (France) and provides more morphological information on this species. An overview of the fossil record of Siricidae in the strict sense is given and the state of knowledge on the different fossils is reviewed.

Key words: Insecta, Siricinae, Messel, Menat, Eocene, Palaeocene

Introduction

The phylogeny and evolutionary history of hymenopteran insects have recently been the subjects of several comprehensive analyses (e. g. Klopstein *et al.* 2013, Sharkey *et al.* 2012) and some studies focussed on basal hymenopterans to which the Siricidae belong (e. g. Malm & Nyman 2014; Krogmann & Nel 2012; Vilhelmsen & Turrisi 2011). But still, the phylogenetic relationships of Siricoidea (woodwasps) are neither well nor reliably resolved. Besides the extant Siricidae and Anaxyelidae, the Siricoidea comprise extinct groups like Gigasiricidae, Myrmiciidae, and Daohugoidae (e. g. Grimaldi & Engel 2005, Krogmann & Nel 2012), and the Siricoidea may be not monophyletic (Vilhelmsen 2001).

The first attempt for a phylogenetic analysis of extant crown-group Siricidae (Siricidae s. str., comprising Siricinae and Tremecinae) was made by Gauld & Mound (1982, Fig. 1) who mainly followed Smith (1978) in recognizing nine extant siricid genera. Taeger *et al.* (2010) recognize eleven extant genera in Siricinae and Tremecinae, while Schiff *et al.* (2012) recognize ten genera.

The extant Siricidae seem to be monophyletic; this is suggested both from morphological data (e. g. Königsmann 1977, Rasnitsyn 1988, Vilhelmsen 2001, Schulmeister 2003) and from molecular data (e. g. Heraty *et al.* 2011, Sharkey *et al.* 2012, Ronquist *et al.* 2012, Klopstein *et al.* 2013; Malm & Nyman 2014).

Within the extant Siricidae, the subfamilies Siricinae and Tremecinae are recognized, for example in the classical study by Benson (1943). This author included *Sirex*, *Xeris*, *Siricosoma*, *Urocerus*, and *Xoanon* in Siricinae, and *Teredon*, *Tremex*, *Eriotremex*, and *Afrotremex* in Tremecinae. Gauld & Mound (1982) recognized both Siricinae and Tremecinae as monophyletic taxa, but in a different grouping; in Tremecinae, they additionally included the genus *Siricosoma* as sister taxon to *Teredon*, *Tremex*, *Eriotremex* and *Afrotremex*; in Siricinae, they included *Xeris*, *Sirex*, *Xoanon*, and *Urocerus*. Wedmann (1998) demonstrated that there are no robust and reliable autapomorphic characters known for Siricinae. This still holds true, and in our opinion this indicates that “Siricinae” may well be paraphyletic. Recently, Schiff *et al.* (2012) revised the extant Siricidae. They compiled a

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