

A new genus of Trichomyiinae (Diptera: Psychodidae) from Upper Cretaceous amber of New Jersey



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ABSTRACT

Xenotrichomyia newjerseyensis a new genus and species belonging to Trichomyiinae within Psychodidae is characterized, described, illustrated and its taxonomic position is discussed. It shares some similarities with Trichomyiinae of group B, but retains some archaic features, such as normal and non-excentric flagellomeres, and possesses an autapomorphy in wing venation that distinguish it from all remaining Trichomyiinae. This discovery represents the first Trichomyiinae (Psychodidae) from the Upper Cretaceous New Jersey amber, and adds more evidence on the very high palaeodiversity of the psychodids since at least the Lower Cretaceous. An updated check list of fossil Trichomyiinae is given.

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1. Introduction

Psychodidae (Diptera: Nematocera) are small true flies with short, hairy bodies and wings that give them a moth-like appearance. The adults have long antennae, containing 12–16 segments, and each segment is bulbous with a ring of long hairs (Quate and Vockeroth, 1981; Wagner, 1997). Their wings are leaf-shaped, either slender or broad, with 9–10 longitudinal veins and no cross-veins in the distal two-thirds of each wing (Quate and Vockeroth, 1981; Wagner, 1997). Adult Psychodidae are commonly nocturnal, associated with damp habitats, and more common and diverse in intertropical regions (Grimaldi and Engel, 2005). Some Psychodidae (such as *Phlebotomus* Loew, 1845) are blood feeders, and important vectors of several infectious diseases, such as leishmaniasis (Azar and Nel, 2003). Some Psychodidae are commonly nuisance pests in bathrooms, because their larvae (such as those from the subfamilies Psychodinae and Sycoracinae) live in aquatic or semi-terrestrial habitats including bathroom sinks (Grimaldi and Engel, 2005).

Psychodid flies are well known in the dipteran fossil record (Ansorge, 1994, 1996; Evenhuis, 1994; Azar et al., 1999, 2003, 2007a, 2007b; Azar and Nel, 2002, 2003; Nel et al., 2002; Wagner, 2002,

2006; Azar and Ziadé, 2005; Lak et al., 2008; Solórzano Kraemer and Wagner, 2009; Azar and Waller, 2010; Wang et al., 2011; Azar et al., 2013). Their earliest incontestable known fossil is from the Lower Jurassic but their occurrence could be traced back to the Triassic (Ansorge, 1994; Fraser et al., 1996; Blagoderov et al., 2007).

Trichomyiinae is a subfamily of short-legged psychodids that have the radial sector with only one vein between the radial and medial forks. They can be found exclusively in wood, such as decaying wood or tree holes filled partly with rain water (Beran et al., 2010). This cosmopolitan group is represented in extant fauna by about 85 species, all included in *Trichomyia* Haliday, 1839 (Satchell, 1956; Duckhouse, 1965, 1978, 1980; Bravo, 1999, 2001), even if this genus encloses a broad range of structures that imposed the creation of different subgenera.

Several other recent genera were created within Trichomyiinae like *Diplonema* Loew, 1845, *Lepria* Enderlein, 1936, and *Eubonetia* Vargas & Diaz Najera, 1953, but Satchell (1956) sank them all in *Trichomyia*. The genus *Phalaenomyia* Loew, 1844 originally proposed without included species is considered by all the workers as a *nomen nudum*.

Duckhouse (1965) concluded that two or more groups are at present intermingled under *Trichomyia*, but he considered that it would be premature to form new genera. Nevertheless he subdivided the Trichomyiinae into two groups A and B based on antenna and palpi structures. Later he considered that this division

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Table 1
Check list of fossil of Trichomyiinae.

Fossil taxa	Age	Deposit
<i>Trichomyia buceras</i> Loew, 1845	Holocene	Indonesian copal
<i>Trichomyia antiquaria</i> Quate, 1961	Middle Miocene	Mexican amber
<i>Trichomyia declivivena</i> Quate, 1963		
<i>Trichomyia discalis</i> Quate, 1963		
<i>Trichomyia glomerosa</i> Quate, 1963		
<i>Trichomyia mecocerca</i> Quate, 1963		
<i>Trichomyia smithi</i> Quate, 1963		
<i>Eatonisca tertiaria</i> Meunier, 1905	Eocene	Baltic & Saxonian amber
<i>Trichomyia brevicornis</i> Loew, 1850		
<i>Trichomyia concinna</i> Meunier, 1905		
<i>Trichomyia crassicornis</i> Meunier, 1905		
<i>Trichomyia decora</i> Meunier, 1905		
<i>Trichomyia distincta</i> Meunier, 1905		
<i>Trichomyia formosula</i> Meunier, 1905		
<i>Trichomyia</i> (=Diplonema) <i>longicornis</i> (Loew, 1850)		
<i>Trichomyia nova</i> Meunier, 1905		
<i>Trichomyia procera</i> Meunier, 1905		
<i>Trichomyia pulchra</i> Meunier, 1905		
<i>Trichomyia tenera</i> Meunier, 1905		
<i>Trichomyia duckhousei</i> Wang, Zhang & Azar, 2011	Lower Eocene	Fushun amber
<i>Eotrichomyia electronica</i> Nel et al., 2002	Lowermost Eocene	French Oise amber
<i>Xenotrichomyia newjerseyensis</i> gen. et sp. nov.	Turonian	New Jersey amber
<i>Trichomyia lengleti</i> Lak et al., 2008	Lower Cenomanian	French Charentes Maritimes amber

N.B. *Trichomyia swinhoei* Cockerell, 1917 from Burmese amber belongs undoubtedly to the subfamily Sycoracinae (Lak et al., 2008). The genus *Diplonema* was synonymized with *Trichomyia* (Satchell, 1956).

was made as the first step towards a phylogenetic analysis of *Trichomyia*, and he considered that neither group is monophyletic (Duckhouse, 1978) but that this classification is still useful taxonomically.

Trichomyiinae comprises two monospecific Cenozoic genera: *Eatonisca* Meunier, 1905 characterized by a very particular wing venation (Azar and Waller, 2010) and *Eotrichomyia* Nel et al., 2002 with the same wing venation as *Trichomyia*, but characterized by male genitalia with stylus bearing a sharp spine as in *Sycorax* Haliday in Curtis, 1839 (Nel et al., 2002). The remaining fossils, all belonging to *Trichomyia*, were discovered in the Lower Cenomanian French amber (Lak et al. 2008), Eocene Fushun, Baltic and Saxonian amber, the Miocene Mexican amber, and the Holocene Indonesian copal (Wang et al., 2011; Loew, 1845, 1850; Meunier, 1905; Quate, 1961, 1963). This psychodid subfamily occurs also in the Lower Cenomanian amber of Myanmar (Azar, personal observation). The fossil evidence from the numerous species found in amber suggests that this group was already diverse since at least the middle Cretaceous (Table 1).

We describe herein a new genus and species (*Xenotrichomyia newjerseyensis* gen. et sp. nov.) of the first fossil trichomyiine fly from the Upper Cretaceous Turonian amber of New Jersey, USA. This new taxa adds more evidence of the rich palaeodiversity for this peculiar group and, as fossilization is an exceptional event, this group was probably as diverse, if not more, than those of recent entomofauna.

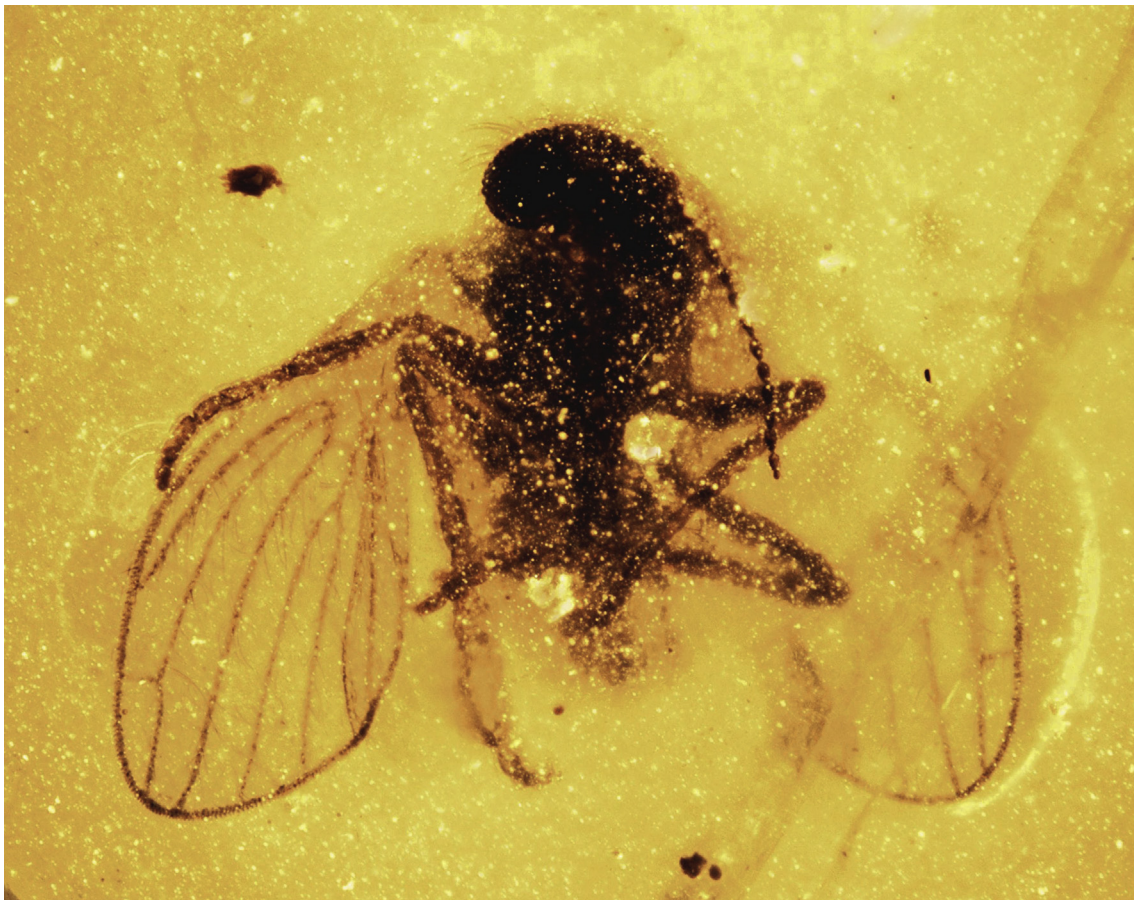


Fig. 1. Microphotograph of the habitus of *Xenotrichomyia newjerseyensis* gen. et sp. nov., holotype, male, specimen n° NJ-141.

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