

First descriptions of males from Eocene Baltic amber in the fossil genus *Mantohalea* (Diptera: Ceratopogonidae)

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ABSTRACT

Males in the predatory fossil genus *Mantohalea* Szadziewski, 1988 from Eocene Baltic amber are described and illustrated for the first time. They represent *Mantohalea laca* (Meunier 1904) and *M. gedanica* Szadziewski 1988. Males in the genus *Mantohalea* have raptorial legs like predatory females and this feature, very rare within biting midges, is difficult to explain.

KEY WORDS : Diptera. Ceratopogonidae. *Mantohalea*. Fossil. Baltic amber. Eocene.

INTRODUCTION

Biting midges (Diptera: Ceratopogonidae) constitute a small family of nematoceros flies, which is well known in the recent fauna and in the fossil record from the Lower Cretaceous to Miocene. The family includes 5471 extant and 253 fossil species (Borkent & Wirth 1997, Borkent pers. comm.). Fossil species from the Lower and Upper Cretaceous as well as from many Tertiary deposits are included into 19 extinct and 25 extant genera. The best known is a fossil fauna of biting midges in Eocene Baltic amber (Szadziewski 1988). *Mantohalea* Szadziewski 1988 is a fossil genus of the predatory tribe Ceratopogonini, which includes biting midges with females feeding on haemolymph of other insects (Szadziewski 1988). Males of biting midges do not take protein meal. The genus, including two species from Baltic amber, was based on females whereas males remained unknown. Some time ago Christel and Hans Hoffeins of Hamburg (Germany) determined two *Mantohalea* males in their collection of amber inclusions and allowed us to study them. The purpose of the present paper is to describe males of two species in the genus *Mantohalea* and complete diagnosis of the genus.

SYSTEMATIC PALAEOLOGY

Order: Diptera Linnaeus, 1758

Family: Ceratopogonidae Skuse, 1890

GENUS: *Mantohalea* Szadziewski 1988

Type species: *Ceratopogon lacus* Meunier 1904, by original designation.

Diagnosis. The genus is characteristic in having single first radial cell, the petiolate media and the fore femur greatly swollen and armed with strong ventral spines in both sexes.

Mantohalea laca (Meunier 1904)

1904 *Ceratopogon lacus* Meunier: 232 (female, Baltic amber).

1988 *Mantohalea lacus*: Szadziewski: 146 (female, Baltic amber).

1997 *Mantohalea laca*: Borkent & Wirth: 101 (in catalogue).

Material. Hoffeins collection, Hamburg, No. 1576-1, 1 male.

Diagnosis. The male of the species is characteristic in having long wing (1.8 mm), the flagellum with well developed plume, broad sternite IX and long 4th palpal segment.

Description. Male. Body brown. Total length 3.0 mm. Flagellum composed of 13 flagellomeres, total length 0.960 mm, plume well developed (Figs. 1A, 1B); distal four flagellomeres 10-13 elongate with proportions as follows: 13-17-18-16. Proboscis long and slender. Palpus 5-segmented, slender; 3rd palpal segment slender without sensory pit, 0.096 mm long; 4th palpal segment slightly shorter than 3rd and 5th segments (Fig. 2A).

Anteprepronotum well developed, collar-like. Scutum with some distinct setae. Scutellum with 4 marginal bristles and some short setae. Paratergite slender. Each coxa bearing 1 strong spine on lateral surface. Femur of fore leg greatly swollen, armed with 8 cone-like ventral spines and some slender spines on anterior and posterior surfaces. Femur of mid leg slender, bearing strong bristles. Femur of hind leg slightly swollen, bearing strong bristles (Fig. 1D). Fore tibia

slightly arcuate, armed with strong curved prolongation. All tibiae with strong bristles. First tarsomere of hind leg with palisade setae and a subbasal spine; tarsal ratio 2.5. Fourth tarsomeres subcylindrical. Claws short, equal. Wing length 1.85 mm, CR 0.73, first radial cell single, media petiolate (Fig. 1C).

Genitalia as in Fig. 2B. Sternite IX broad, with distinct caudomedian excavation. Tergite IX not visible. Gonocoxite enlarged on basal half, with distinct ventral expansion. Gonostylus with forked apex armed with 2 spines. Aedeagus long and slender with low basal arch. Parameres not visible.

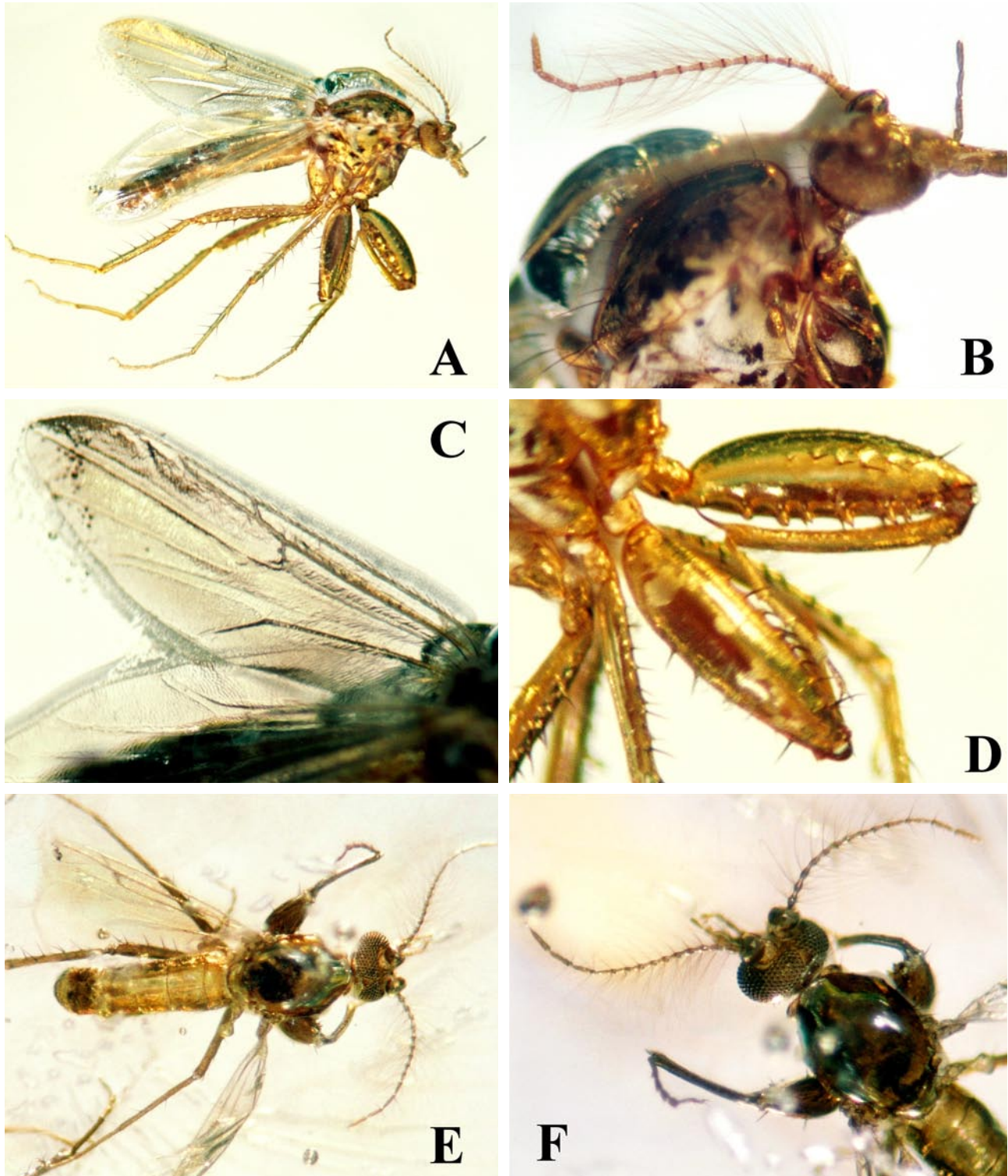


Figure 1. Males of *Mantohelea laca* (Meunier) (A, D) and *M. gedanica* Szadziewski (E, F). A, total habitus in lateral aspect, B, head, C, wing, D, fore legs, E, total habitus in dorsal aspect, F, head and thorax.

Mantohelea gedanica Szadziewski 1988

1988 *Mantohelea gedanica* Szadziewski: 146 (female, Baltic amber).

Material. Museum of Amber Inclusions, University of Gdańsk, MIB No. 4494, Baltic amber, 1 male with associated female. Gift of Christel and Hans Hoffeins.

Diagnosis. Males of the species can be easily distinguished by short wing (1.08 mm), weakly developed plume of flagellum, 4th palpal segment distinctly shorter than 3rd and 5th segments and narrow sternite IX without caudomedian excavation in genitalia.

Description. Male. Body dark brown. Total length 1.6 mm. Flagellum composed of 13 flagellomeres, total length 0.718

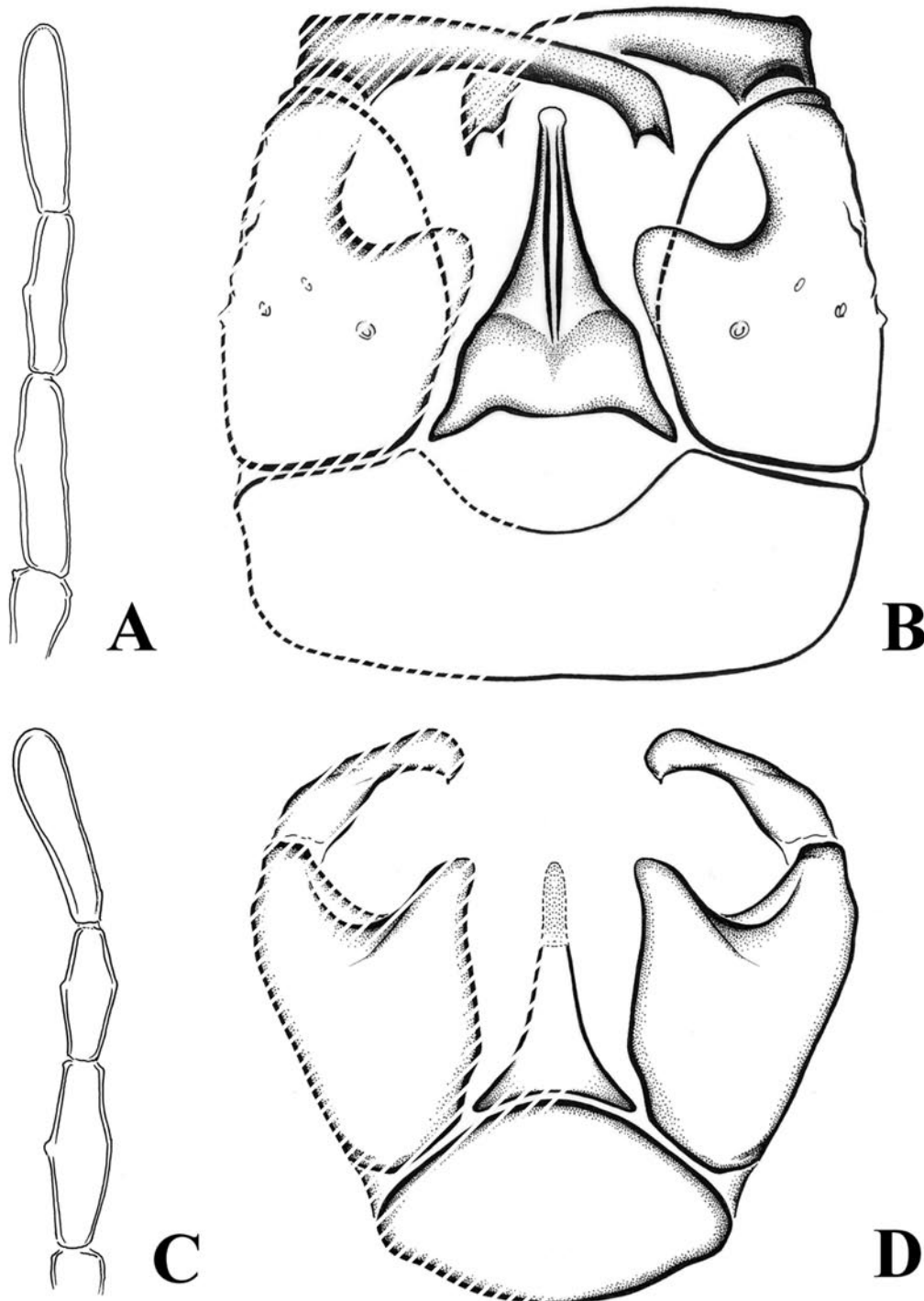


Figure 2. Males of *Mantohelea laca* (Meunier) (A, B) and *M. gedanica* Szadziewski (C, D). A, C – palpus; B, D – genitalia (ventral aspect, tergite IX and parameres not indicated).

mm, plume weakly developed (Figs. 1E, 1F); distal four flagellomeres 10-13 elongate with proportions as follows: 10-11-12-13. Proboscis long and slender. Palpus 5-segmented, slender; 3rd palpal segment slender, without sensory pit; 4th palpal segment (0.030 mm) distinctly shorter than 3rd (0.048 mm) and 5th segments (0.050 mm) (Fig. 2C).

Antepnotum well developed, collar-like. Scutum with some distinct setae. Scutellum with 4 marginal bristles and some short setae. Paratergite narrow. Each coxa bearing 1 strong spine on lateral surface. Femur of fore leg greatly swollen and armed with cone-like ventral spines and some slender spines on anterior and posterior surfaces. Femur of mid leg slender and bearing strong bristles. Femur of hind leg slightly swollen and bearing strong bristles. Fore tibia slightly arcuate and armed with strong curved prolongation. All tibiae with strong bristles. First tarsomere of hind leg with palisade setae and a subbasal spine; tarsal ratio 2.4. Fourth tarsomeres subcylindrical. Claws short, equal. Wing length 1.08 mm, CR 0.79, first radial cell single, media petiolate (Fig. 1E).

Genitalia as in Fig. 2D. Sternite IX narrow, without caudomedian excavation. Tergite IX not visible. Gonocoxite enlarged on basal half, with large ventral expansion. Gonostylus with swollen apex. Aedeagus barely visible, long and slender. Parameres not visible.

DISCUSSION

Predatory biting midges demonstrate important sexual differences in the morphology of their legs. Males do not feed on the haemolymph of other insects and, as a result, have unarmed legs and short simple claws. Females usually have raptorial legs, which are used for catching prey, mostly chironomids or other small insects. However, males of *Mantohelia* described above have raptorial legs like fe-

males. Among extant predatory biting midges only in *Heteroceratopogon* Wirth & Grogan 1988 of the tribe Ceratopogonini, known from one species living in New Caledonia, fore legs in males and females are of raptorial type (Wirth & Grogan 1988). Unfortunately, the feeding behaviour of extant males is unknown and we do not know whether these raptorial legs are used for hunting or for mating.

ACKNOWLEDGEMENTS

We thank to Christel and Hans Hoffeins of Hamburg (Germany) for selecting males of *Mantohelia* in their collection and deposition of one male and female of *Mantohelia gedanica* in the Museum of Amber Inclusions at the University of Gdańsk. We are much indebted to Dr. Elena Lukashovich of Paleontological Institute, Russian Academy of Sciences, Moscow (Russia) and to Dr. Mikhail Mostovski of Natal Museum, Pietermaritzburg (South Africa), for their kind comments improving the article.

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Received: 15th December 2006

Accepted: 12th January 2007