

Biting midges (Diptera: Ceratopogonidae) from Mexican amber

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ABSTRACT. A small collection of biting midges from Oligocene-Miocene Mexican amber was examined. It included the following extant genera *Forcipomyia* (12 specimens), *Dasyhelea* (3), *Brachypogon* (1) and *Nannohelea* (2).

KEY WORDS: Diptera, Ceratopogonidae, Mexican amber, inclusions.

The Ceratopogonidae are one of the best studied family of nematocerous Diptera. There are presently almost 5,000 known species, with almost 5% of these represented as fossils. Biting midges are relatively common in Cretaceous and Tertiary ambers, and the excellent preservation of some specimens often allows for as detailed examination as for extant species. As a result, their history is well documented from the Lower Cretaceous to the present (BORKENT 1995, SZADZIEWSKI 1996).

Biting midges from the Tertiary of North America (sensu Laurentia) are also relatively well known. They are described from Oligocene-Miocene Dominican amber in a series of papers by SZADZIEWSKI and GROGAN (1994, 1966, in prep.) and from Miocene calcareous nodules from California (PALMER 1957, PIERCE 1966). The latter, however, have little taxonomic value at the present time because most were described from pupae which are poorly known in the extant fauna. Only undetermined ceratopogonids were mentioned by HURD et al. (1962) From Mexican amber.

Mexican amber from the State of Chiapas (Simojovel area) ranges from Upper Oligocene to Lower Miocene and was deposited there 22.5-26 Ma (BERGGREN & VAN COUVERING 1974). The Chiapas amber was produced by an ancestral *Hymenaea* tree (LANGENHEIM 1966). Fossil insects in Mexican amber were primarily collected by HURD, SMITH and DURHAM of the University of California in the 1950's when they organized collecting trips to the State of Chiapas (HURD et al. 1962).

We have examined a small collection of biting midges from the Museum of Paleontology, University of California, Berkeley (UCMP), and the American Museum of Natural History in New York (AMNH). We are grateful to Dr. DAVID LINDBERG (UCMP) and Dr. DAVID GRIMALDI (AMNH) for the loan of this material.

See SZADZIEWSKI & GROGAN (1994) for our methods, and BORKENT (1995) and SZADZIEWSKI (1996) for an explanation of terminology.

Subfamily Ceratopogoninae

***Brachypogon* KIEFFER (subg. *Isohelea* KIEFFER)**

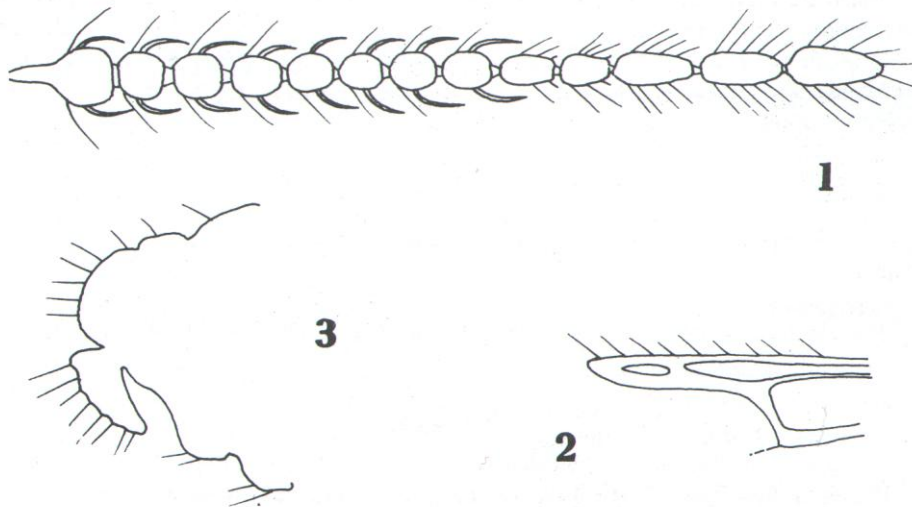
UCMP: B-7048-47, 1 female. 4th palpal segment with single seta, 2 radial cells, wing membrane with some macrotrichia at wing apex, 4th tarsomeres cordiform.

Comments

Members of the subgenus *Isohelea* of *Brachypogon* are distributed nearly worldwide and present in Central and South America (SPINELLI & GROGAN 1994). Males are of greatest diagnostic value. Recorded from Tertiary Baltic amber (SZADZIEWSKI 1988), Saxonian amber (SZADZIEWSKI 1993) and Dominican amber (SZADZIEWSKI & GROGAN 1994, in prep.).

***Nannohelea* GROGAN et WIRTH**

UCMP: B-7043-31, 1 female, barely visible. **UCMP: B-7051-16**, 1 female, well visible (Figs. 1-3). Body length 0.8 mm. 4th and 5th palpal segments fused. Flagellum (Fig. 1) 324 μ m long, AR 0.80. Wing length 0.53 mm, CR 0.60, second radial cell well developed (Fig. 2), some macrotrichia along wing margin present. Cerci slender, triangular (Fig. 3). Shape of cerci seems to be unique within *Nannohelea*. The extant species from Colombia is known only from the male, which is smaller, with wing length 0.41 mm. However, within biting midges, females are usually larger than males.



Figs. 1-3. *Nannohelea* undet., female. 1 - flagellum, 2 - radial veins of wing, 3 - apex of abdomen, lateral aspect.

Comments

This genus of pantropical distribution includes 4 minute extant species; in Central America a single species is known from Colombia - *N. clastrieri* GROGAN et WIRTH (GROGAN & WIRTH 1990) (Fig. 4). Two fossil species of the genus are known from Baltic amber (SZADZIEWSKI 1988) and undetermined females are recorded from Saxonian (SZADZIEWSKI 1993) and Dominican amber (SZADZIEWSKI & GROGAN in prep.). European (Baltic and Saxonian amber) fossil species have 5 segmented palpi, while Central American (Dominican and Mexican amber) fossil *Nannohelea* have fused 4th and 5th palpal segments like extant members of the genus.

Subfamily Forcipomyiinae

Forcipomyia undet. (12 females)

AMNH: CH 1, Chiapas State, Simojoval, purchased by B. Zeder from Carlos Villar, 1987, 1 female [TR(II) 2.2, plus Hymenoptera, Coleoptera, Nycetophilidae]. CH 9, same data as above, 1 female [TR(III) 1.05]. CH-SH-6, Mexico, Chiapas nr Simojoval, Upper Oligocene, S. Hendrickson, 1 female [TR(III) 2.7, claws deeply bifid, plus Chironomidae and Cyclorrhapha]. UCMP: B-7042-5, 1 female [TR(III) about 1.0]. B-7043-33, 1 female. B-7045-41, 42, 2 females [decomposed, TR(III) 2.3]. B-7045-43, 1 female. B-7046-36, 1 female [TR(III) 2.1]. B-7047-34, 1 female [both radial cells well developed, wing length 0.57 mm, proboscis long, TR(III) 2.3]. B-7047-35, 1 female [TR(III) 2.1]. B-7048-48, 1 female [claws distinctly bifid, wing length 0.70 mm, TR(III) 2.1].

Comments

Specimens examined are not characteristic, and are similar to those found in Dominican amber. Some of these look like members of the subgenus *Lepidohelea* KIEFFER, *Trichohelea* GOETGHEBUER or *Thyridomyia* SAUNDERS. *Forcipomyia* is a worldwide distributed genus common in most moist habitats and found in all Tertiary ambers.

Dasyhelea undet. (2 females, 1 male)

UCMP: B-5340-25, 1 female [barely visible]. B-5341-31, 1 male. B-7043-30, 1 female.

Comments

The genus is distributed worldwide and is recorded from most Tertiary ambers.

DISCUSSION

Biting midges from UCMP are enclosed in very thin plates probably prepared from amber during the late 1950's. Since that time, the amber pieces with inclusions exposed to air conditioning have become totally dark. As a result, the inclusions are now barely visible and we advise curators to mount or store these in Canada balsam in order to protect against further oxidation (BORKENT 1995).

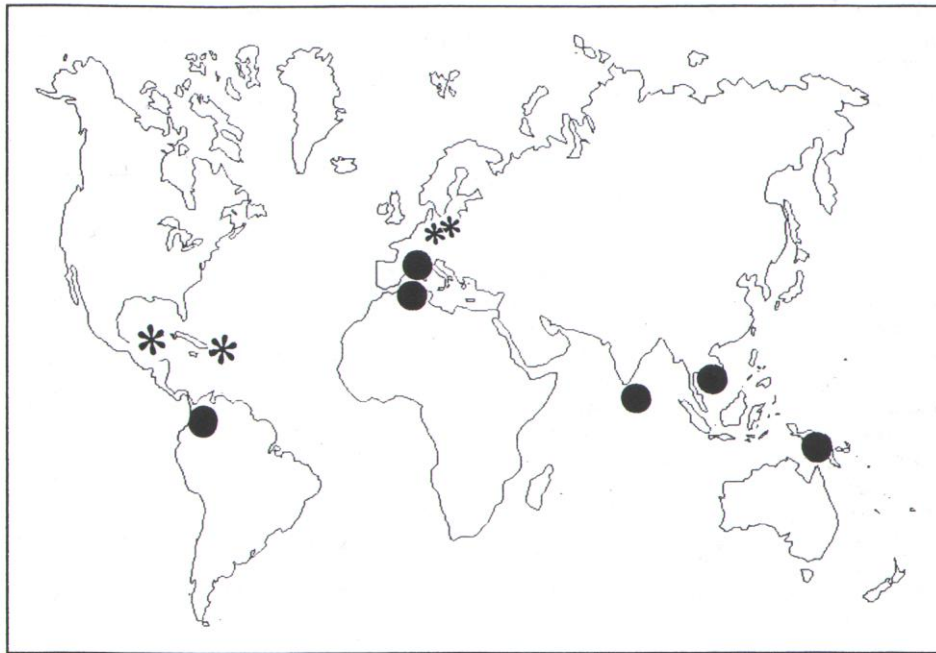


Fig. 4. Locality records of extant (●) and fossil (*) species of *Nannohelea*.

All fossils studied belong to the extant genera *Brachypogon*, *Nannohelea*, *Forcipomyia* MEIGEN and *Dasyhelea* KIEFFER. These genera are present in the extant fauna of Central America and Tertiary fossil fauna reported from Dominican amber (SZADZIEWSKI & GROGAN 1994). These modern genera are of Tertiary origin (SZADZIEWSKI 1996) known since Paleocene (*Forcipomyia*) (SZADZIEWSKI 1990) and Upper Eocene (other genera) (SZADZIEWSKI 1988).

Presently, *Nannohelea* is known from the tropics and subtropics, while the three other genera are widely distributed. Despite this very small sample its faunal composition is similar to that of Dominican amber. In Dominican amber, we found 11 extant genera, all of which occur now in Central America (SZADZIEWSKI & GROGAN 1994).

Our results show that only extant genera of biting midges are present in this amber, and this agrees with previous conclusions of most students of Mexican amber insect fauna.

However, there are also investigations indicating extant species in Oligocene-Miocene Mexican amber, e.g. the termite *Kaloterms nigrinus* SNYDER which lives in Guatemala (SNYDER 1960). Some other entomologists described fossil genera among Coleoptera: *Mionelater* BECKER (BECKER 1963) in Elateridae, or *Profidia* GRESSITT (GRESSITT 1963) in Chrysomelidae.

Some authors, for example GAGNÉ (1973), did not introduce new names for fossils which belong to genera that include species difficult to determine on a worldwide basis. They claim that naming them would tell us no more than we already know. We tend to agree with this point of view. Zoological taxons should not be treated as inventory numbers for museums, paleontologists or catalogues. Entomological taxa are worthless when accorded names are without accompanying diagnostic characters.

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