

Schwenckfeldina archoica sp. nov. (Diptera, Sciaridae) from the middle Miocene Mexican amber

Mónica M. SOLÓRZANO KRAEMER⁽¹⁾ & Werner MOHRIG⁽²⁾

⁽¹⁾ Institut für Paläontologie, Nussalle 8, 53115, Bonn, Germany. E-mail: msolorzanokraemer@gmail.com

⁽²⁾ Puddemin 6, 18574, Poseritz, Germany. E-mail: wmohrig@hotmail.com

ABSTRACT

Schwenckfeldina archoica sp. nov. is the first sciarid fly described from Mexican amber, approximately 20 million years old. The species shows in all details modern morphological structures and is very closely related to recent representatives of the *Schwenckfeldina forcipigera* species group, presently known from at least ten species distributed in Central America.

KEY WORDS: Sciaridae. *Schwenckfeldina*. Amber insects. Mexican Amber. Central America.

INTRODUCTION

The specimen described here is embedded in the Mexican Chiapas amber, which is considered to be of middle Miocene age (Rust & Solórzano Kraemer in prep.). The plant of origin is *Hymenaea mexicana* (Poinar 2002). In the Middle Miocene, the region of Simojovel de Allende, where the fossil resin deposits are now found, was a coastal area and the forests of *Hymenaea* (Guapinol) grew along the coastline in a mangrove region (Langenheim *et al.* 1967). Although Mexican amber is a significant source of Cenozoic insect fossils and its study is of great importance in understanding of the palaeoecology and palaeobiogeography of the Central American region, little work has been carried out on this fauna. The family Sciaridae from Mexican amber was only briefly mentioned by Gagné (1980) and no descriptions have been published.

Sciaridae, as common forest insects, are very often included in amber. At present, 41 fossil species from European ambers (Baltic amber and Bitterfeld or Saxonian amber, perhaps of the same age) have been identified (Mohrig & Röschmann 1994a,b, Röschmann & Mohrig 1995a, b, c). Recent studies of Dominican amber, which is considerably younger than the Baltic amber and of Miocene origin with estimated age between 15 and 20 million years (Iturralde-Vinnent 2001), detected 20 new fossil species (Mohrig & Röschmann 2005). All the Dominican amber species possess more modern features than those from the European ambers and show more similarities to the recent fauna of the Holarctic region than to the recent fauna of Central or South America.

MATERIAL AND METHODS

The specimen Mx 367 is housed in the Staatliches Museum für Naturkunde, Schloss Rosenstein, Stuttgart, Germany.

For microscopic observation the amber piece was cut down to a thickness of about 3 mm, polished with fine leather. The specimen was studied and drawn under cover slips on a slide in a drop of paraffin oil (Mohrig & Röschmann 2005). For conservation the piece of amber was embedded in Canada balsam on a microscope slide.

Terms used for adult structures primarily follow Menzel & Mohrig 2000 and Mohrig & Röschmann 2005 (Figs. 1A-D). Generic identification of the fossil specimen is based on the revision of Palaearctic Sciaridae by Menzel & Mohrig (2000, pp. 508-515)

SYSTEMATIC PALAEONTOLOGY

Order: Diptera Linnaeus, 1758

Family: Sciaridae Bilberg, 1820

GENUS: *Schwenckfeldina* Frey 1942

Type species: *Sciara carbonaria* Meigen 1830

The genus *Schwenckfeldina* was established on the basis of the type species *Sciara carbonaria* Meigen 1830 from the Palaearctic Region and is represented from this region by five quite different species (Menzel & Mohrig 2000). A few additional species are also distributed in North America, Papua New Guinea and Central America.

The main characteristics of this genus are: an indistinct patch of short setae at the tip of fore tibiae; three-segmented palpi with a patch of short sensillae; short flagellomeres with fairly short cylindrical nodes with a lattice-like or barred surface structure and short necks; gonocoxites at the inner border densely covered with long or very long bristles; gonostylus large or very large, with three apical spines (*S. filamentosa* Mohrig 2003 and related species), or with apical spines combined with large spines on the inner side of gonostylus (*S. carbonaria* Meigen 1830 and related species), or only densely setose on apical portion, but with long and curved spines on a more or less large lobe in the middle of inner side (*S. forcipigera* Enderlein 1911 and related species, found presently only in Central America).

Schwenckfeldina archoica Mohrig & Solórzano Kraemer sp. nov.

Figures 1-2

Etymology. After the Greek *archaic* = *archoica*, because of the great similarity of the fossil specimen to living species.

Holotype. Mx 367, housed in the SMNS - Staatliches Museum für Naturkunde, Schloss Rosenstein, Stuttgart, Germany.

Type locality. The piece of amber comes from Chiapas, Mexico. The locality is situated in Simojovel de Allende, considered to be middle Miocene in age (Rust & Solórzano



Figure 1. Holotype of *Schwenckfeldina archoica* sp. nov. Specimen Mx 367. Scale bar 0.5 mm

Kraemer in prep.). Simojovel is a mining district located in the northern part of the state of Chiapas, 17°08'19"N, 92°42'00"W, at 600 m; approximately 50 km from the city of Tuxtla.

Diagnosis. The species is characterized by long bristles along the inner ventral side of gonocoxites, large and broad rounded gonostyli, densely covered with bristles at the apical third of the inner side and with three strong spines in the middle of the inner side.

Description. Head. Antennae with 2+14 segments, uniformly brownish; flagellomeres shorter than wide and densely setose, with short necks; scape and pedicel brownish; flagellomere 4 about 2.2 x longer than wide; palpus

long, three-segmented. Thorax. Brown; mesonotum fairly highly arched, with long setae, scutellum with two long and several shorter setae; posterior pronotum bare; wings pale; R1 as long as R, joining C before M-fork; R5 with few ventral macrotrichia on apical third; $y = x$, both without macrotrichia; M-fork fairly broad, shorter than M-stem; CuA-stem short; posterior veins without macrotrichia. Halteres short, brown. Coxae and legs brownish; fore tibiae with one spur, middle and hind tibiae with two spurs of same length and longer than diameter of apex. Claws untoothed. Abdomen. Brown; base of hypopygium and tegmen not visible; gonocoxite with very long bristles on inner ventral margin; gonostylus somewhat shorter than gonocoxite, thick and rounded, with long setae on apical third of inner side and three long spines in middle; one shorter spine

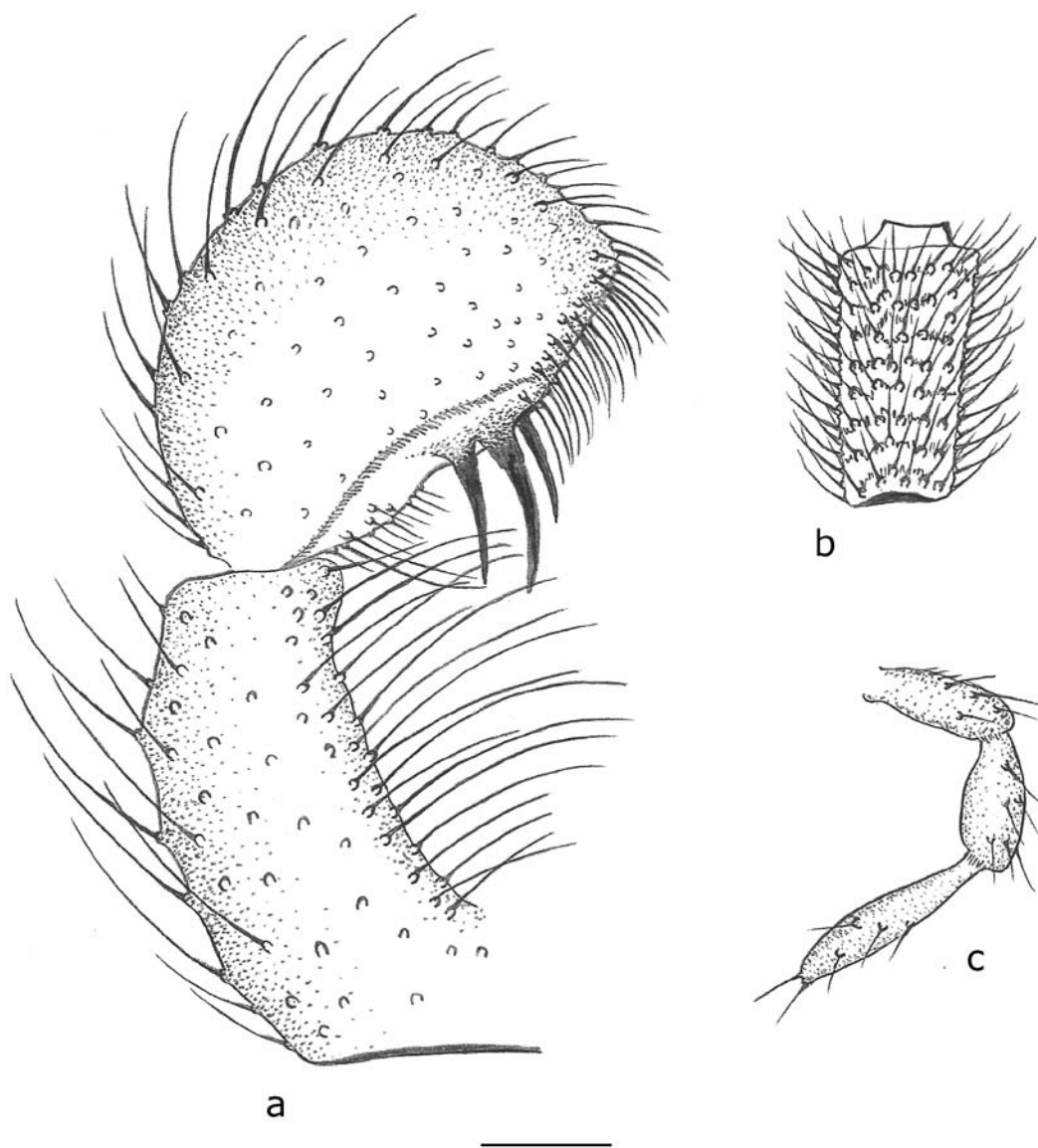


Figure 2. *Schenckfeldina archoica* sp. nov. a) hypopygium, ventral view of the right half with gonocoxite and gonostylus (details combined from both gonostyli); b) 4th flagellomere; c) palpus. Scale bar 0.1 mm

inserted more dorsally; outer side uniformly covered with long setae. Body length 3.5 mm.

Remarks. The amber species is embedded in good condition. Gonocoxites, gonostyli, palpi, wings, halteres and legs are all well visible.

DISCUSSION

The above species is the first sciarid fly described from Mexican Amber. Mexican amber is considered the same age as Dominican amber, both are about 20 million years old (Rust & Solórzano Kraemer unpubl.). The sciarid amber fauna from the Dominican Republic shows a dominance of species with connections to the recent Holarctic fauna (Mohrig *et al.* 2004). None of the species found in Dominican amber represented a genus typical for the recent fauna of Central or South America (Mohrig & Röschmann 2005). Like the species from Dominican amber, the new fossil species from Mexican amber shows in all details modern morphological structures, too. It is closely related to the living species-group *S. forcipigera* Enderlein (Mohrig 2003, fig. 10), a typical and species-rich group within the sciarid fauna of Central America with at least eight closely related, but undescribed new species (Mohrig, unpublished data). *Schwenckfeldina archoica* is the first species from Central American ambers which represents a typical member of a species group of autochthon origin of the recent Central American sciarid fauna. All morphological details of the new fossil species seem to be modern and only a few differences from recent species have been found. Other taxa from other insect groups from Mexican amber show also this distribution pattern (Solórzano Kraemer *et al.* 2005, Solórzano Kraemer & Petrulevičius in press, Wichard *et al.* in press).

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