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***Otroacizzia soriae* sp. nov., a new Miocene psyllid (Insecta, Hemiptera, Psyllidae) from Dominican amber**

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ABSTRACT

A new species of the fossil genus *Otroacizzia* Klimaszewski, 1996 (Hemiptera, Psyllidae) is described as *Otroacizzia soriae* sp. nov. on the basis of a female specimen. This species is preserved in mid-Miocene amber from La Toca mines, Dominican Republic. The genus *Otroacizzia* is the most diverse psyllid genus in Dominican amber, with four known species. The new species differs from the three previously known species by the presence of a subapical dark band in the fore wing from the anterior part of the end of vein Rs to the end of vein Cu_{1b}, which has a gap in the middle of the cell c₁. Other differences in the fore wing are the presence of a strongly curved vein Cu_{1b} and a cell c₁ clearly longer than cell m₁. Finally, the antennal segment 3 of the new species is one and a half times longer than segment 4.

Key words: amber, Miocene, insect, Psyllidae, *Otroacizzia*, sp. nov., Dominican Republic.

RESUMEN

Se describe una nueva especie del género fósil *Otroacizzia* Klimaszewski, 1996 (Hemiptera, Psyllidae) a partir de un ejemplar hembra: *Otroacizzia soriae* sp. nov. Esta especie está conservada en ámbar del Mioceno medio de las minas de La Toca en República Dominicana. Con cuatro especies conocidas, el género *Otroacizzia* es el género de psiloideo con mayor diversidad en el ámbar dominicano. La nueva especie difiere de las tres especies ya conocidas por la presencia de una banda oscura subapical en el ala anterior desde la parte anterior del final de la vena Rs hasta el final de la vena Cu_{1b}, la cual presenta una discontinuidad en el medio de la celda c₁. Otras diferencias en el ala anterior son la presencia de una vena Cu_{1b} fuertemente curvada y una celda c₁ claramente más larga que la celda m₁. Finalmente, el tercer segmento antenal de la nueva especie es una vez y media más largo que el cuarto segmento.

Palabras clave: ámbar, Mioceno, insecto, Psyllidae, *Otroacizzia*, sp. nov., República Dominicana.

Introduction

Sternorrhyncha are typically divided into the superfamilies Psylloidea, Aleyrodoidea, Aphidoidea and Coccoidea. The Psylloidea, or “plant lice”, are the sternorrhynchans most morphologically and biologically generalized, which possibly is the living sister group to the rest of the Sternorrhyncha (Grimaldi & Engel, 2005). Psyllids are very uncommon in the fossil record, and the oldest psyllids are from the Early Jurassic to mid-Cretaceous of Eurasia, with representatives of the extinct families Liadopsyllidae and Malmopsyllidae (Grimaldi & Engel, 2005). The Present-day distribution pat-

terns of the holarctic and neotropical Psylloidea, and the origin of the nearctic fauna, have been discussed by Hodkinson (1980, 1989). Psyllidae is the largest family of Psylloidea with ca. 1,800 living species in over 155 genera worldwide (from the Arctic Circle to the subantarctic islands). Extant species of Psyllidae are feeders on a wide range of hostplants, including Annonales and Asterales, and some of them produce galls.

The fossil record of the family Psyllidae is very poor. Up to now, this family of hemipterans has been found in amber (Baltic and Dominican ambers) and in laminate sediments originated in lacustrine environments around the world (*e.g.*,

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Koonwarra Fossil Bed in Australia, Gubei District of Shandong in China, Argun layer from Krimskaya in Russia, Randecker Maar in Germany, Ribesalbes and Rubielos de Mora in Spain: Jell & Duncan, 1986, Qi-bin *et al.*, 1988; Klimaszewski, 1993a; Ansorge & Kohring, 1995; Peñalver *et al.*, 1996 and Peñalver, 1998, respectively).

The species of the superfamily Psylloidea described from Dominican amber are the next: *Succinopsylla dominicana*, *Vicinilura reposta*, *Indepsylla mortua*, *Parapsyllopsis carabeus*, *Otroacizzia muta*, *O. prosapia*, *O. tertia*, *Paropsylla olima*, *Heterotrioza grimaldii*, *Rhinopsyllida acutealla*, *Primascena subita*, *Sulciana macroconi*, and *Trioacantha indocilia*. All these species were described by Klimaszewski (Klimaszewski, 1995, 1996 and 1998). Interestingly, all the genera listed above are genera based on specimens from Dominican amber and not found in other deposits, except for the extant genus *Heterotrioza*. Consequently, Dominican amber contains a particular psyllid palaeofauna, which is the most diversified in the fossil record. Klimaszewski (1995, 1996 and 1998) attributed erroneously an Oligocene-Miocene age for Dominican amber, which is actually mid-Miocene.

Here we describe a new species of the fossil genus *Otroacizzia* Klimaszewski, 1996 on the basis of a female specimen from Dominican amber, extending the known number of species of this genus up to four.

Material and Methods

Amber on the Caribbean island of La Española (Dominican amber) is abundant in the mountains 10-20 km north and north-east of Santiago de los Caballeros. Dominican amber contains abundant and diversified insects as bioinclusions (Grimaldi & Engel, 2005). The amber is excavated by locals, and the piece studied here was acquired through purchase, directly from the local miners in La Toca mines, in 2000.

Dominican amber is mid-Miocene in age, 15-20 Ma (Iturralde-Vinent & MacPhee 1996); the age of Dominican amber has been confused in recent years, but all evidences support the Miocene age indicated. This amber was formed by an extinct species of *Hymenaea* tree (Leguminosae: Caesalpinioidea), living species of which today exude copious resin when the bark is wounded by storms or boring insects (Langenheim, 2003). *Hymenaea* today grows primarily in coastal habitats of western Central America, the Caribbean and throughout the Amazon Basin, with one species living in eastern Africa (Langenheim, 2003).

Morphological terminology used here generally follows that of the Klimaszewski's articles.

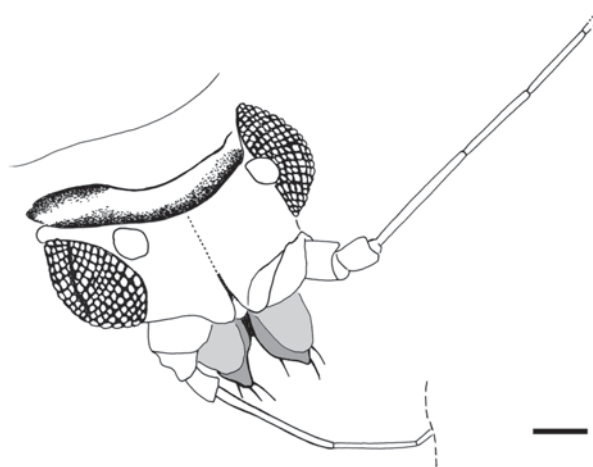


Fig. 1.—Camera lucida drawing of the head of *Otroacizzia soriae* sp. nov. (MCN CP 06-1), latero-dorsal view, from Dominican amber. Scale bar = 0.1 mm.

Systematic Palaeontology

Class Insecta

Order Hemiptera

Superfamily Psylloidea

Family Psyllidae

Genus *Otroacizzia* Klimaszewski, 1996

Type-species: *Otroacizzia muta* Klimaszewski, 1996: 31.

Otroacizzia soriae sp. nov.

(Figs. 1, 2 & 3-left-, Pl. 1)

Derivation of name: Patronym in memory of the Spanish palaeontologist Dolores Soria, who was a specialist in Tertiary macromammals.

Holotype: Female specimen MCN CP 06-1 (Peñalver Collection), housed in the Museo de Ciencias Naturales de Valencia, Spain. The holotype is complete and well preserved in a small piece 2 X 2 X 0.3 cm. The piece also contains a chalcidoid wasp (MCN CP 06-2) and a mite (MCN CP 06-3) as syninclusions.

Type locality: Mid-Miocene amber from La Toca mines in the Cordillera Septentrional, Dominican Republic (La Española).

Diagnosis: species of the fossil genus *Otroacizzia* with a subapical dark band in the fore wing from the anterior part of the end of vein Rs to the end of vein Cu_{1b}; this band has irregular margins, does not cover the marginal membrane between the veins and it has a gap in the middle of the cell cu₁. Vein Cu_{1b} in fore wing strongly sinuate towards the wing base. Cell c₁ in fore wing clearly longer than cell m₁.

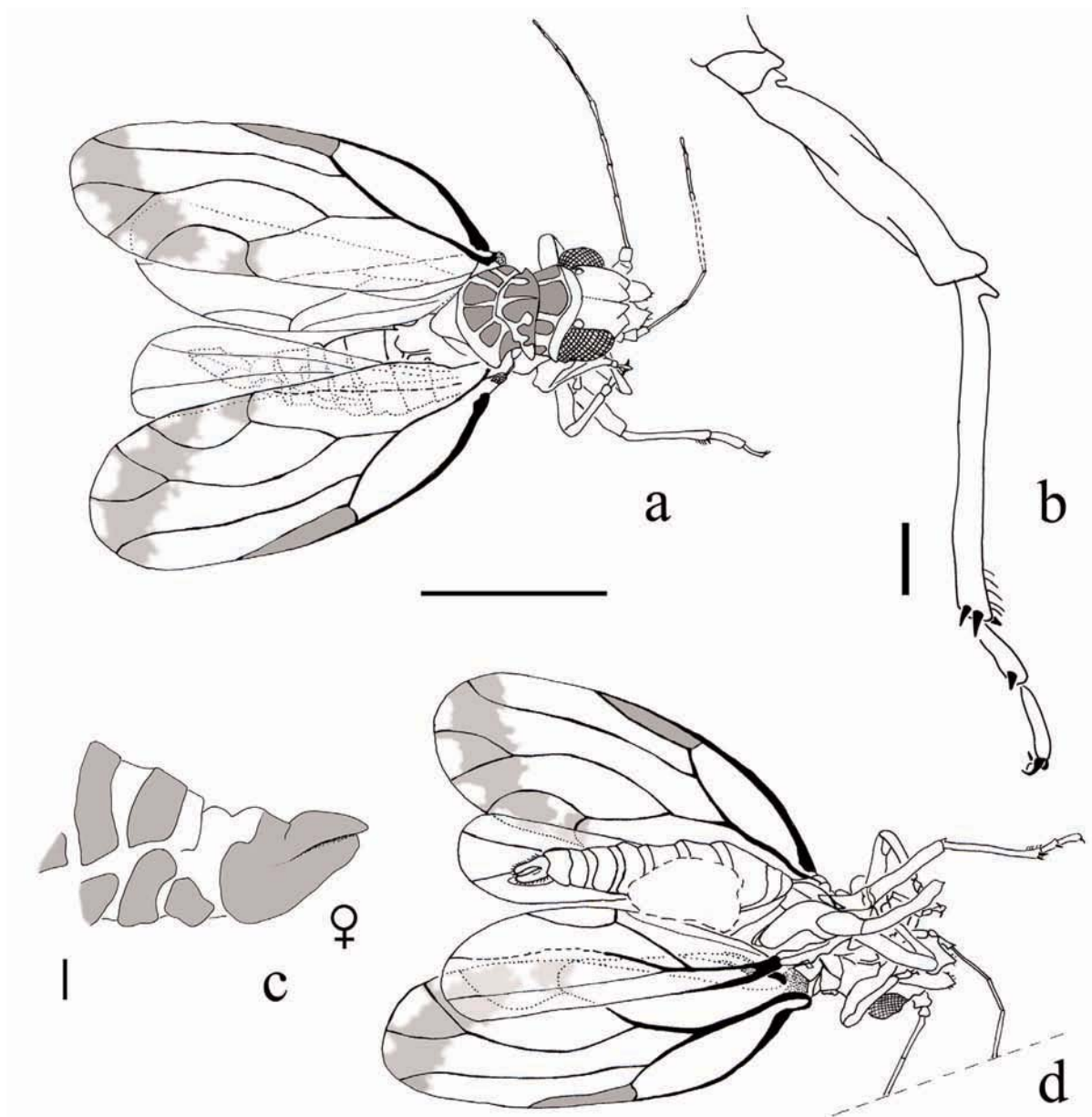


Fig. 2.—Camera lucida drawings of the general habitus and details of *Otroacizzia soriae* sp. nov. (MCN CP 06-1) from Dominican amber. **a**- dorsal view of the body, **b**- latero-ventral view of the hind leg showing three distal spurs on the tibia and an unique spur on the basitarsus, **c**- female terminalia, **d**- latero-ventral view of the body. Horizontal scale bar = 1 mm, vertical scale bars = 0.1 mm.

Antennal segment 3 is one and a half times longer than segment 4.

Description: Female. Body length 2.6 mm. Head width 0.55 mm. Vertex broad, width 0.30 mm. Genal cones well-developed (fig. 1), 0.13 mm long, cone-like, with single apices and short setae. Antennae filiform (figs. 1, 2a & 2d), 1.55 mm long, ten-segmented, with segment 3 1.5 times longer than the next one, a little shorter than the combination of

segments 4+5 and equal to the combination of segments 8+9. Antennal segment 10 short. Dorsal surface of the thorax with broad dark bands (fig. 2a). Fore wing elongate (fig. 3-left-), 2.30 mm long, 0.89 mm width. Wing apex situated between the end of veins Rs and M_{1+2} . Wing membrane rugose, apparently without marginal spinules. Subapical dark band from the anterior part of the end of vein Rs to the end of vein Cu_{1b} ; this band has irregular

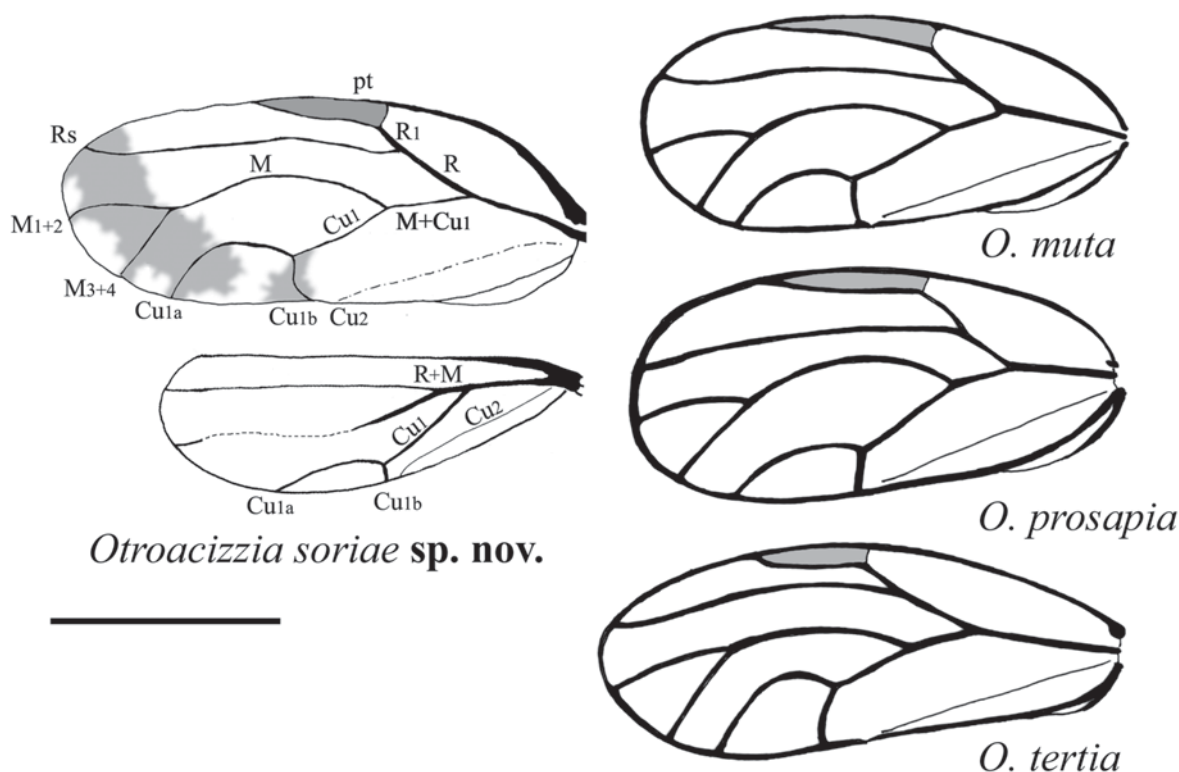


Fig. 3.—Wings of *Otroacizzia* spp. pt = pterostigma, Cu_1 - Cu_2 = cubital veins, M- M_{3+4} = medial veins, R- R_1 = radial veins, Rs = Radial sector. Nomenclature for hind wing venation sensu Klimaszewski (1993b). Wings of *O. muta*, *O. prosapia* and *O. tertia* redrawn from Klimaszewski (1996). Not to the same scale (scale bar for *O. soriae* sp. nov = 1 mm).

margins, does not cover the marginal membrane between the veins and it has a gap in the middle of the cell cu_1 . Pterostigma membranous, broad and long (0.64 mm length, 0.11 mm width). Vein Rs sinuate. Veins R and M+ Cu_1 subequal in length. Vein M+ Cu_1 slightly shorter than vein Cu_1 . Vein M strongly arched, divided into M_{1+2} and M_{3+4} . Cell cu_1 with the coefficient 2.1, longer than cell m_1 . Vein Cu_{1a} strongly arched and vein Cu_{1b} strongly sinuate towards the wing base. *Hind wing* (fig. 3-left-) 1.84 mm long, 0.57 mm width, with vein R+M present. Vein R_1 absent. Cubital vein originates far the wing base and is divided into two branch (Cu_{1a} and Cu_{1b}), which contact with the posterior wing margin. Cu_{1b} and Cu_2 well-developed. The cell cu_1 is undivided and relatively small, narrow, with the coefficient 4.0. *Hind leg* (fig. 2b) 1.17 mm length (femur 0.43 mm, tibia 0.51 mm, tarsus 0.23 mm). Hind tibia with a basal tubercle and with three distal black spurs (two together in the ventral side and one in the dorsal side). Tarsus two-segmented and hind basitarsus with a single black spur.

Claws with basal lobe (fig. 2b). *Female terminalia* wedge-shaped, broad at base (fig. 2c) [it was possible to observe the terminalia in lateral and ventral views] with dorsal plate 0.30 mm long. Ventral plate wide, 0.35 mm long. *Male*. Unknown.

Discussion

The new species belongs to the genus *Otroacizzia* by the following combination of characteristics: 1- genal cones with apices of unique shape, 2- veins R and M+ Cu_1 subequal in length, 3- hind basitarsus with a single black spur. This genus was established on the basis of a male specimen, thus other of its characteristics is the presence of a well-developed posterior lobe. Up to today, this extinct genus only has been found in Dominican amber, and contains three described species, all by Klimaszewski (1996): *O. muta*, *O. prosapia* and *O. tertia*. The females of the three species are known, and for this reason the comparison of *O. soriae* sp. nov. was satisfactory.

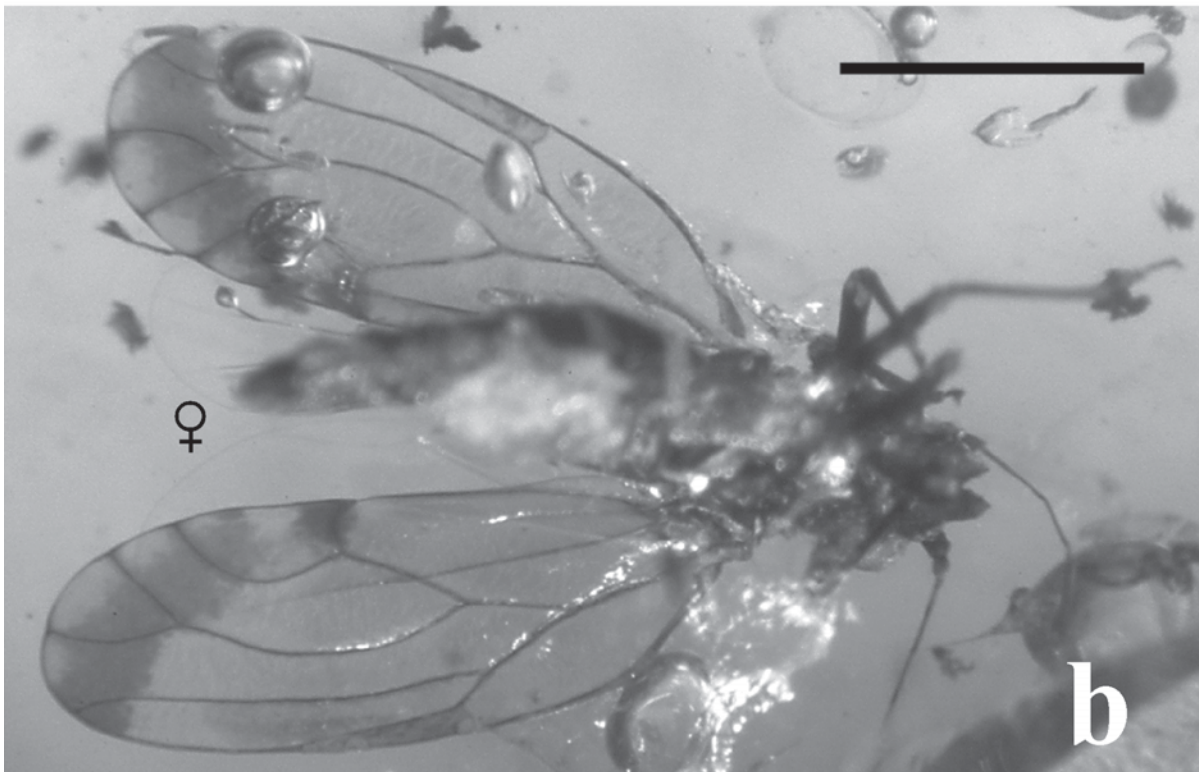
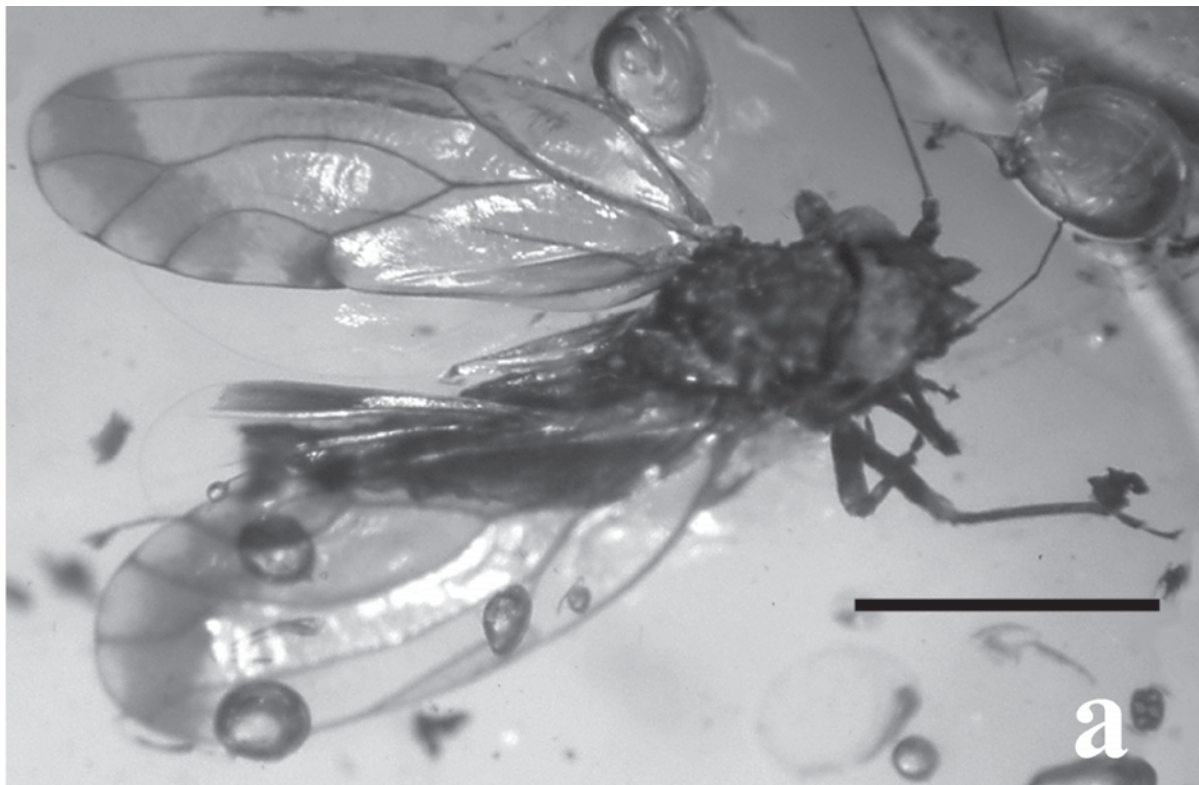


Plate 1.—General habitus of *Otroacizzia soriae* sp. nov. (MCN CP 06-1) from Dominican amber. **a**- dorsal view, **b**- latero-ventral view. Scale bars = 1 mm.

Aside from the diagnostical characters and the more elongate fore wing compared to the three previously known species, *O. soriae* sp. nov. differs from *O. muta* by bigger fore wing and the apex of fore wing is not situated at the end of vein M_{1+2} . The new species differs from *O. prosapia* by bigger fore wing, and longer antennae, and the antennal segment 3 is clearly longer than the total length of segments 7+8, and the fore wing apex is not situated at the end of vein M_{1+2} , and the fore wing vein $M+Cu_1$ and Cu_1 are more similar in length. *O. soriae* sp. nov. differs from *O. tertia* by a smaller body size, a longer pterostigma compared to the fore wing length, and a very different cell c_1 coefficient in fore wing (2.1 vs. 1.4 in *O. tertia*).

As indicated by Klimaszewski (1993b) the hind wing venation in psyllids has interesting features to conduct taxonomical and phylogenetical analyses, but it has remained poorly studied. Thus, not even this author described the hind venation when he established the genus *Otroacizzia* and the three species present in Dominican amber (Klimaszewski, 1996). The excellent preservation of the new specimen studied here allows us a complete reconstruction of the hind wing for the genus *Otroacizzia* (fig. 3). According to Klimaszewski (1993b), the R+M vein present in the hind wing of the new species (fig. 3-left) constitutes a pleiomorphy.

Otroacizzia is close to the Extant genus *Acizzia* and differs in the relative length of $M+Cu_1$ respect to R, the occasional presence in *Acizzia* of two spurs in the hind basitarsus, and in the relative size of the posterior lobe (Klimaszewski, 1996). *Acizzia* has a worldwide distribution: Afrotropical Region, Australian Region (Australia, New Zealand), Nearctic Region (Mexico and USA), Neotropical Region (Chile) and Palaearctic Region.

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