

The oldest fossil record of the extant subgenus *Leptoconops* (*Leptoconops*) (Diptera: Ceratopogonidae)

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Abstract. *Leptoconops zherikhini* sp. nov. and undetermined *Austroconops* WIRTH et LEE are reported from Lower Cretaceous amber of Alava, Spain. Both, *Leptoconops* SKUSE and *Austroconops* are extant genera reported for the first time from this amber and this is the earliest report of *Leptoconops* sensu stricto from the Lower Cretaceous.

Key words: Diptera, Ceratopogonidae, *Leptoconops*, *Austroconops*, Alava, Cretaceous, amber, new species.

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I. INTRODUCTION

In the first report of Ceratopogonidae from the Lower Cretaceous amber from Alava, Spain (113 million years old) SZADZIEWSKI and ARILLO (1998) described two species in extinct genera: *Archiaustroconops alavensis* (subfamily Austroconopiniae) and *Protoculicoides skalskii* (basal lineage).

Among 37 further specimens of biting midges we found four females of the extant genus *Leptoconops* (Leptoconopiniae), and 11 specimens of the extant genus *Austroconops* WIRTH et LEE (Austroconopiniae). Two additional specimens of *Protoculicoides* BOESEL and 19 more *Archiaustroconops* SZADZIEWSKI were also discovered. One barely preserved female remains undetermined.

In this paper we describe a new species of *Leptoconops* from Alava amber in the extant subgenus. The remaining species will be described elsewhere.

A c k n o w l e d g e m e n t s. We would like to express our sincere thanks to Dr Art BORKENT of Enderby, Canada, for a critical review of the manuscript and correction of the English.

II. MATERIAL AND METHODS

Pieces of amber were embedded in artificial resin Epotek 301 and then polished. Drawings were made with the aid of a camera lucida. The studied material is housed in the Museo de Ciencias Naturales de Alava, Siervas de Jesus 24, 01001 Vitoria-Gasteiz (Alava, Spain).

III. SYSTEMATICS

Subfamily **Leptoconopinae** NOÉ, 1907

References: SMEE 1966: 993; SZADZIEWSKI 1988: 231; SZADZIEWSKI 1996: 46; BORKENT 2001: 1.

D i a g n o s i s. Wing crossvein r-m absent. Palp with 4 segments. Eyes widely separated.

D i s c u s s i o n. During studies of Lower Cretaceous biting midges from Lebanese amber SZADZIEWSKI (1996) found a female close to *Leptoconops* but with 13 flagellomeres, with the costal vein prolonged beyond the end of radial vein R3, and slightly elongated cerci. He proposed the new genus *Fossileptoconops* SZADZIEWSKI placed within the subfamily. When BORKENT (2000) redescribed the type-species *F. lebanicus* SZADZIEWSKI he concluded that there was no evidence indicating a sister-group relationship between *Fossileptoconops* and *Leptoconops*, and recognized the position of *Fossileptoconops* within Leptoconopinae as questionable. Subsequently BORKENT (2001) described the new subgenus *Palaeoconops* within *Leptoconops* from Lebanese amber.

We consider the subfamily to include two genera, the extinct *Fossileptoconops* SZADZIEWSKI and the extant *Leptoconops*, which is divided into several subgenera: the extinct *Palaeoconops* BORKENT (female with 13 flagellomeres) and the remaining extant *Leptoconops* s. str., *Styloconops* KIEFFER, *Proleptoconops* CLASTRIER, *Megaconops* WIRTH et ATCHLEY, *Brachyconops* WIRTH et ATCHLEY (female with 12 flagellomeres) and *Holoconops* KIEFFER (10-11 flagellomeres).

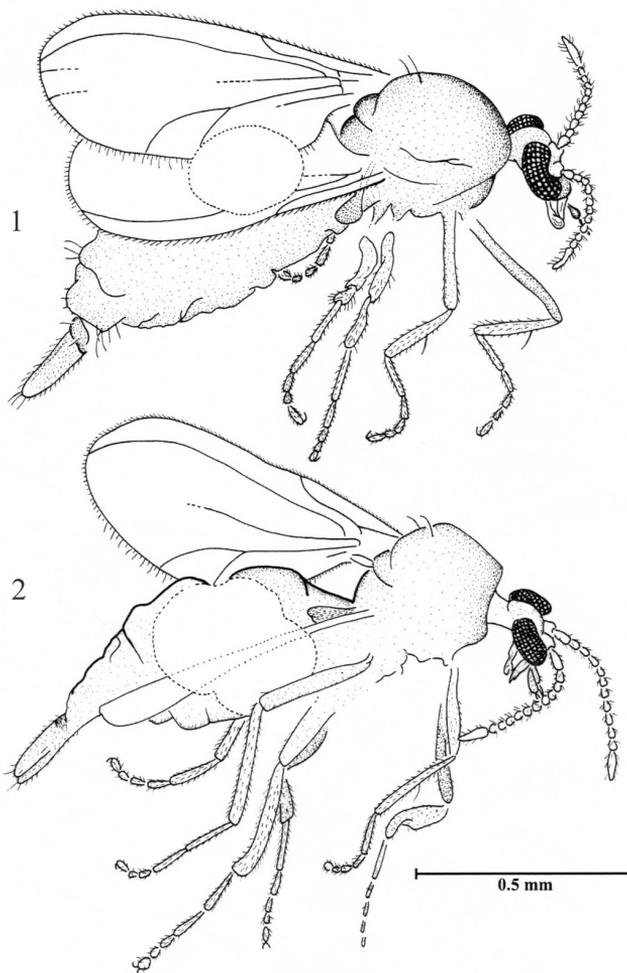
Genus **Leptoconops** SKUSE, 1889

D i a g n o s i s. Female antenna with 10-13 flagellomeres. Costal vein prolonged or not beyond end of R3. Female cerci long or short, without long setae.

D i s c u s s i o n. *Leptoconops* is a small genus including 134 extant (BORKENT 2001) and 9 named fossil species. Larvae of extant *Leptoconops* live in moist and usually saline soil of desert areas and coastal and inland beaches. They burrow in the soil or sand feeding on the microorganisms found there. Adults are diurnal and females feed on the blood of mammals, birds and reptiles. Most species of the genus are distributed in tropical and subtropical regions throughout the world. However, there are species described from as far north as Moscow district in Russia and the Yukon Territory in Canada.

Extinct species are described from Tertiary Baltic amber (*L. succineus* SZADZIEWSKI 1988), Upper Cretaceous Siberian amber (*L. boreus* KALUGINA 1991, *L. sibiricus* SZADZIEWSKI 1996), New Jersey amber (*L. curvachelus* BORKENT 1996, *L. copiosus* BORKENT 1996), Canadian amber (*L. primaevus* BORKENT 1995), Hungarian amber (*L. clava* BORKENT 1997), and Lower Cretaceous Lebanese amber (*L. amplificatus* BORKENT 2001, *L. antiquus* BORKENT 2001). Unnamed *Leptoconops* are recorded also from Palaeocene amber of Sakhalin and Upper Cretaceous French amber (SZADZIEWSKI 1990; SZADZIEWSKI & SCHLÜTER 1992). Females of fossil species are more diagnostic than males and have more or less elongated cerci. The only fossil species with unknown females is *L. clava* BORKENT 1997. Keys to Cretaceous males and females were given by BORKENT (2001). The key to named females includes an error in couplet 4 which should read as follows (BORKENT, personal comm.):

4. Flagellomeres 3-11 somewhat elongate. *copiosus* BORKENT (Canadian amber)
 –. Flagellomeres 3-11 spherical. *primaevus* BORKENT (Canadian amber)
 *boreus* KALUGINA (Taimyr amber)



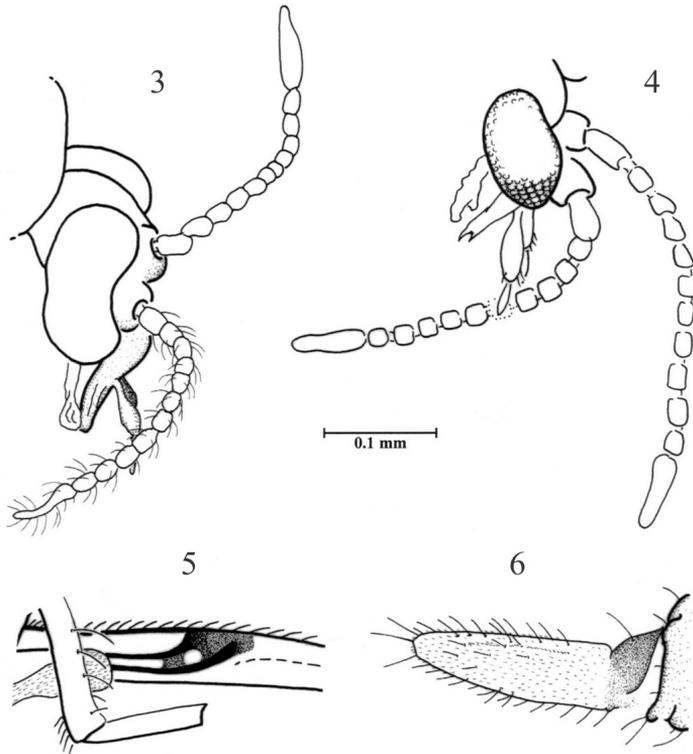
Figs 1-2. *Leptoconops zherikhini* sp. nov., female. 1 – holotype MCNA 9176, 2 – paratype MCNA 8897.

Presently described species extends fossil record of the extant subgenus *Leptoconops* s. str. to the Lower Cretaceous.

***Leptoconops zherikhini* sp. nov.**

Figs 1-6

D i a g n o s i s. Females of new species are similar to those of *Leptoconops boreus* KALUGINA 1991 (SZADZIEWSKI 1996) from Upper Cretaceous Siberian amber and *L. primaevus* BORKENT 1995 from Upper Cretaceous Canadian amber in having 12 flagellomeres, simple tarsal claws, long cerci, short proboscis and more or less spherical flagellomeres 2-11. They fall to the couplet 4 of the key proposed by BORKENT (2001) and presented above. Females of *L. zherikhini* can be separated from those of *L. primaevus* by more slender cerci in lateral view and from *L. boreus* by slightly more elongate flagellomeres 2-11.



Figs 3-6. *Leptoconops zherikhini* sp. nov., female. 3 – lateral aspect of head, holotype, MCNA 9176; 4 – lateral aspect of head, paratype MCNA 8897; 5 – wing veins R1 and R3, female MCNA 8976.2; 6 – lateral aspect of cercus MCNA 9176.

E t y m o l o g y. The species is named in honour of the late our dear friend and colleague Vladimir V. ZHERIKHIN in recognition of his valuable contributions to the study of fossil insects.

M a t e r i a l e x a m i n e d. Holotype female, amber from Alava, Lower Cretaceous, Spain, Museo de Ciencias Naturales de Alava, MCNA 9176. Paratype female, MCNA 8897. Two other females which are likely members of this species are not designated as paratypes. They are preserved in amber pieces MCNA 8976.2 and 9571.

D e s c r i p t i o n. Female (Figs 1, 2). Body length about 1 mm. Eyes widely separated. Flagellum composed of 12 flagellomeres; flagellomeres 2-11 more or less spherical; 12th cylindrical (Figs 3, 4). Proboscis relatively short. Palpus 4-segmented; third palpal segment long, broad, fourth slender (Fig. 4). Wing length 0.6-0.7 mm; Costa not prolonged beyond vein R3 (Fig. 5), vein R4+5 well developed to wing apex (Figs 1, 2). Legs slender; claws simple. Tarsal ratio (TR) of hind leg about 1.4. Cerci elongate, slender, about 3.1 times longer than broad (Fig. 6).

Male unknown.

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