

**A New Fossil Crane Fly from the Early Pannonian of the Styrian Basin
(Diptera: Tipulidae)**

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ABSTRACT: A new species of Miocene crane fly, *Tipula paleopannonia*, new species, is described and figured from a well preserved forewing. The specimen derives from the Paldau Formation (Early Pannonian, ca. 11.3 Ma) and is the first new species of *Tipula* described from the Miocene of Europe since the mid-1800's.

ZUSAMMENFASSUNG: Anhand eines gut erhaltenen Vorderflügels wird in vorliegender Arbeit eine neue Schnakenart, *Tipula paleopannonia*, sp. n., beschrieben. Das Stück stammt aus der Paldau-Formation (Frühes Pannonium, ca. 11,3 Mio.J.) und ist die erste Neubeschreibung einer *Tipula*-Spezies aus dem Miozän Europas seit Mitte des 19. Jahrhunderts.

KEY WORDS: *Tipula*, Neogene, Miocene, Austria, Europe, crane fly, taxonomy

Crane flies (family Tipulidae) represent the basalmost and most species-diverse lineage of Diptera (true flies), adults of which are slender and elongate with gangly long legs. Larvae are saprophagous and generally live in wet soil or mud, and are distinguishable among other flies for their sclerotized and retractable head capsule. Tipulidae are split in some classificatory schemes into three separate families – Limoniidae, Cyliptromiidae, and Tipulidae *s.str.* The family is well documented in the fossil record, particularly the genus *Tipula* which has over 75 species described from the Tertiary of North America and Eurasia (e.g., Evenhuis, 1994; Krzemiński, 2000; Byers, 2011). While many species have been documented, the Tertiary fauna of Europe has not been the focus of recent investigation and, indeed, the last Miocene *Tipula* to be described from Europe were those species proposed by Unger (1841) and Heer (1849).

Herein we provide a report on a new fossil crane fly recovered from the Paldau Formation in the Styrian Basin (Fig. 1). The general insect fauna recovered to date from the Paldau site has been reviewed by Engel and Gross (2008a), with the most remarkable species documented thus far that of a giant primitive termite (Engel and Gross, 2008b, 2009), likely of the family Archotermopsidae (*sensu* Engel *et al.*, 2009). The specimen described herein is the same as that referred to by Engel and Gross (2008a: 56, fig. 4b). The geological setting is thoroughly described by Engel and Gross (2008a).

The specimen (Inv. No. LMJ 204.151) is that of an essentially complete crane fly forewing (Tipulomorpha: Tipulidae) represented by part and counterpart, although the counterpart is missing the apical half of the wing. The wing has undergone some deformation during preservation such that the apical fourth is slightly crumpled and folded transversely, setting the apicalmost portion off at an oblique angle relative to the remainder of the wing. The venation is detailed in figure 1, with the apical

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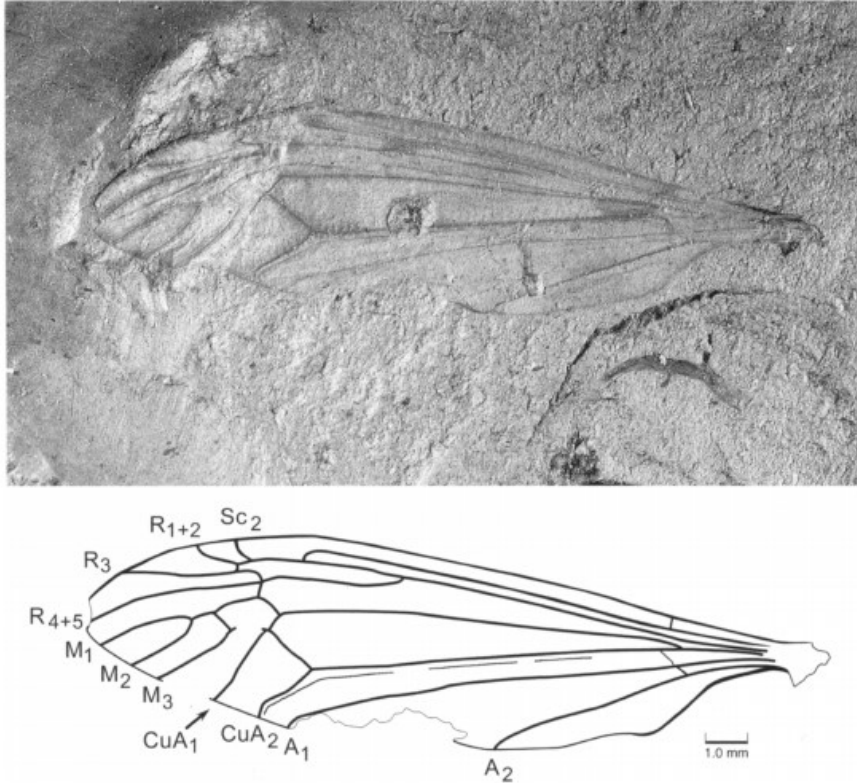


Fig. 1. Holotype forewing of *Tipula paleopannonia* Engel and Gross, new species (LMJ 204.151); photomicrograph above (note that the apex is bent downward and distorted), venational details illustrated below (the wing is drawn with the apex reconstructed to a more normal orientation).

portion straightened so as to resemble as it would have been in life, although owing to the damage as preserved the space between veins M_3 and CuA_1 is missing. For the description of this new species we follow the venational nomenclature suggested by McAlpine (1981) and Alexander and Byers (1981), recognizing that CuA_1 may be in fact M_4 .

Systematic Paleontology

Genus *Tipula* Linnaeus

Tipula paleopannonia Engel and Gross, new species

(Fig. 1)

DIAGNOSIS: Forewing with Sc merging with R opposite about two-thirds length stem of R_{2-5} (Rs); R_3 nearly twice as long as R_{1+2} (Fig. 1); abscissa of R_1 before R_{1+2} very short; discal cell short; M_3 touching CuA_1 briefly rather than connected by short crossvein; CuA_2 and CuP with distinct apical arch before terminating at

posterior wing margin; A_2 relatively long and straight, about three-quarters length of A_1 .

DESCRIPTION: Body not preserved; forewing – total length as preserved 19.7 mm, maximum width 4.9 mm; Sc_1 absent, Sc merging with R_1 opposite about two-thirds length stem of R_{2-5} (Rs); R_{2+3} stem arched, very short; R_2 exceedingly short, shorter than abscissa of R_1 before R_{1+2} ; R_3 nearly twice as long as R_{1+2} ; abscissa of R_1 before R_{1+2} very short; M_{1+2} stem divided by $m_{1+2}-m_3$ crossvein, apical abscissa M_{1+2} shorter than basal abscissa, apical abscissa about three-quarters length basal abscissa; discal cell short, much shorter than M_3 ; M_3 touching CuA_1 briefly rather than connected by short crossvein; basal abscissa CuA_1 straight, not arched, about two-thirds length of distal abscissa CuA_1 ; CuA_2 and CuP with distinct apical arch before terminating at posterior wing margin; CuP relatively faint; A_2 relatively long and straight, about three-quarters length of A_1 ; apparently with some faint maculations around Sc_2 , origin of R_{2-5} (Fig. 1), between M and CuA basally and perhaps more faintly apically in the same cell, perhaps faintly around apex of R_3 , otherwise wing membrane apparently unmarked.

HOLOTYPE: LMJ 204.151, Late Miocene (Early Pannonian, ca. 11.3 Ma), Paldau, Paldau Formation, Styrian Basin, Austria; deposited in the Landesmuseum Joanneum, Graz.

ETYMOLOGY: The specific epithet is a combination of *palaios* (Gr., ancient) and Pannonia, the ancient name for a province of the Roman Empire that corresponds with the region from which the fossil originated.

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