



## The identity of the fossil *Psilocephala tarsalis* (Statz, 1940) (Diptera: Asiloidea)

Fossils are crucial to our understanding of the evolution of organisms. They provide minimum dates for the occurrence of taxa, show past distribution patterns, and are important for establishing phylogenetic hypotheses. The value of a fossil depends to an important degree on the accuracy of its classification. Unfortunately, fossils are difficult to correctly classify, as they display only a small percentage of characters which are discernable in living organisms. Continuing advance in systematic knowledge, leading to increasingly complex classifications, create an ongoing need for a reevaluation of previously described fossils.

The deposit from the mines near Rott (southern Germany) are about 25 million years old (Oligocene) and yield many well preserved compression fossils of plants and insects. Many of these fossil taxa were described by the school teacher Georg Statz, who published numerous papers in the 1930's and 40's on the fossil insects he found in the mining waste heaps. He described species from many different insect orders and often consulted the leading experts of the time. Amongst the many taxa he described is one stiletto fly (Therevidae), which the first author examined in an effort to reevaluate all fossil stiletto fly taxa (Hauser & Irwin 2005a, b). Statz's daughter sold his collection to the Natural History Museum of Los Angeles County (LACM) in 1954. In 2004 the fossil plants were returned to the Institute of Paleontology in Bonn, Germany, while the insect fossils remained in the collection of the Department of Invertebrate Paleontology of the LACM.

**Material and Methods.** Photographs of the fossils were captured with a Nikon CoolPix 4500® digital camera through a Nikon SMZ 1500® dissecting scope and enhanced using Adobe Photoshop® software. Line drawings were made using Adobe Illustrator® software from the digital images.

**Redescription.** The fossil is a nearly complete specimen in dorsal (slightly lateral) orientation on a single plate (Fig. 1). Only the left hind leg is obscured and the head seems to be a bit distorted, otherwise the specimen is in perfect condition. On the head the different sized ommatidia are visible. It seems that the frontal ommatidia are much larger than the lateral ones. Because of the preservation of the fossil, the frontal ommatidia are visible "through" the head, which is visible from a dorsal- posterior view. The eyes are clearly separated. A structure on the top of the head can be interpreted as a raised ocellar tubercle with one circular structure, which could be the remains of one ocellus. The antennae are relatively short and overlap each other. The flagellum may consist of a single ovate segment (possibly with a much smaller apical segment), but the preservation does not allow for detailed examination of the antenna. The thorax and the scutellum are sparsely covered by short setae; no macrosetae are discernable. The legs are short and thick, covered with short setae, and the tarsal segments have some thicker and longer macrosetae. The claws are medium-sized, elongate and not strongly curved. The wings are nearly perfectly preserved and the most striking feature is the strongly sinuate vein  $R_4$  (Fig. 2). Vein  $R_1$  reaches C before  $R_{2+3}$ , thus leaving cell  $r_1$  open. Cell  $r_4$  is open widely,  $m_3$  is closed and the veins  $M_1$ ,  $M_2$  and  $M_3$  reach the wing margin. The abdomen consists of six visible segments with large male genitalia, which bend laterally. All segments and the genital capsule are covered with short setae.

**Discussion.** Statz justified placing this species into the therevid genus *Paraclia* (Enderlein, 1936) as follows: "Because of the length of the antenna, which is shorter than the head, this species belongs into the Thereva-group. The merging of  $m_3$  and  $cu_1$  shortly before the wing margin, the eyes touching, as well as the lack of a shiny red abdominal band, are all characters which are pointing towards the genus *Paraclia* Enderlein, to which the fossil species shows the closest relation, also in other aspects." (Statz 1940: 131, translated from German).

Statz was influenced by the characters listed in Kröber (1913) and Enderlein (1936). It is clear that Statz was not sure about the placement of this species, as he put a question mark behind the genus name. In addition, he never provided justification as to why he placed this species into the Therevidae in the first place. At present, *Paraclia* is considered a synonym of *Psilocephala*, which is the genus under which Evenhuis listed this species in his World Fossil Diptera catalog (Evenhuis 1994).

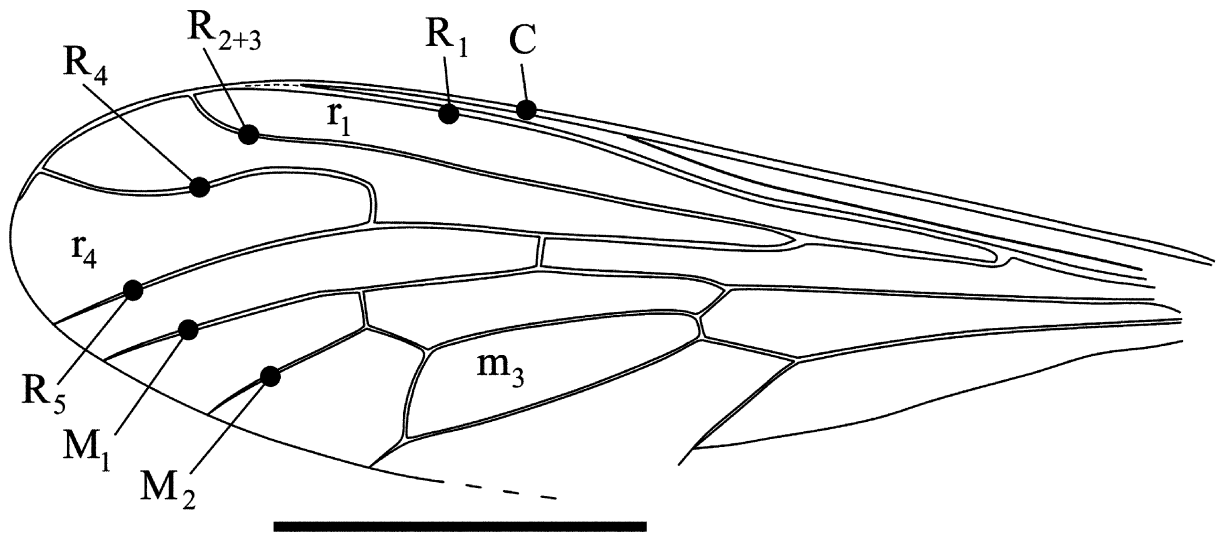


**FIGURE 1.** Photograph of the holotype of *Paraclia tarsalis* Statz, 1940.

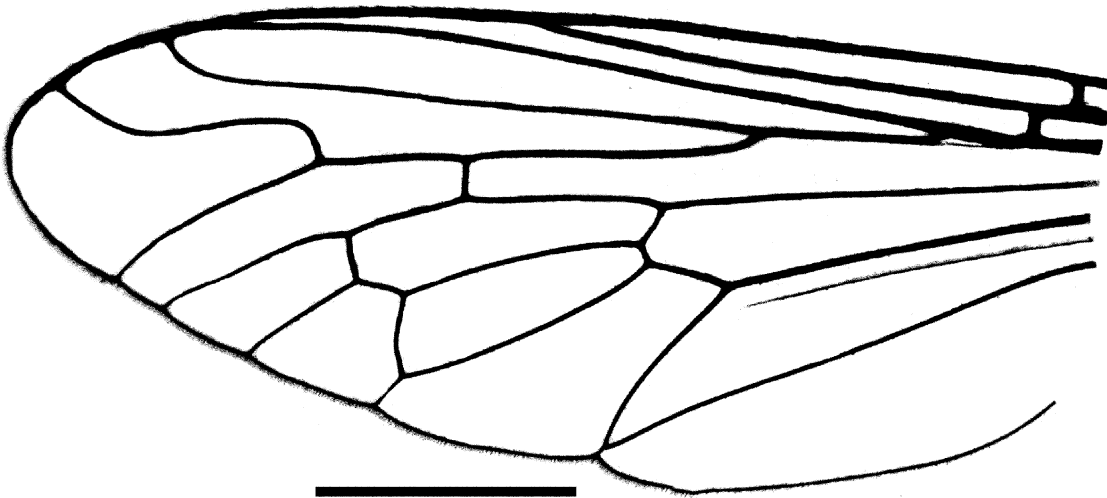
There are some characters in Statz' description which could not be confirmed during reexamination of the type specimen. Statz described the eyes as "very big, touching, without hairs"; however the eyes are clearly separated. Also the three ocelli mentioned by Statz could not be found.

From the characters discernable in the fossil, most of them mentioned in the original description or visible in the drawing and picture included in the description, it is clear that this species does not belong in the Therevidae. The robust legs with the strong claws, and the raised ocellar tubercle are especially characteristic of Asilidae but are not found in Therevidae. The compact gestalt, the six visible abdominal segments and the strongly sinuate  $R_4$  are typical for the asilid tribe Laphystiini.

The fossil is best placed in the genus *Psilocurus*. Indeed, the wing (Fig. 3) of the recent Central Asian species *Psilocurus hypopygialis* (Paramonov, 1930) matches the fossil almost perfectly. *Psilocurus hypopygialis* also has an enlarged genital capsule similar to that of the fossil. For these reasons we move the fossil species into the family Asilidae as *Psilocurus tarsalis* (Statz, 1940), **new combination**.



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**FIGURE 2–3.** Drawing of the wing of *Psilocurus tarsalis* (Statz, 1940); C = costal vein, M<sub>1</sub> = first medial vein, M<sub>2</sub> = second medial vein, R<sub>1</sub> = first radial vein, R<sub>2+3</sub> = second and third radial vein, R<sub>4</sub> = fourth radial vein, R<sub>5</sub> = fifth radial vein, m<sub>3</sub> = third medial cell, r<sub>1</sub> = first radial cell, r<sub>4</sub> = fourth radial cell. Scale bar = 1 mm. **3.** Photograph of the wing of *Psilocurus hypopygialis* (Paramonov, 1930). Scale bar = 1 mm.

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