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Original article

# The oldest known chironomids of the tribe Tanytarsini (Diptera: Chironomidae) indicate plesiomorphic character states☆

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ABSTRACT

Taxonomic studies on chironomids of the tribe Tanytarsini recorded in Eocene Baltic amber from the Rovno region have revealed two new species: *Archistempellina perkovskyi* and *Stempellinella ivanovae*. Both species display interesting characters supporting evolutionary trends in the tribe. *A. perkovskyi* nov. sp. combines plesiomorphic characters, thus consolidating the hypothesis that the genus *Archistempellina* is one of the basal lineages of the tribe Tanytarsini. The antennal flagellum composed of 13 discernible segments found in *S. ivanovae* nov. sp. is defined as a plesiomorphic character state opposite to a reduced number of flagellomeres in extant species; the nipple-like process on the apex of the gonostylus is recognised as a unique character in the Tanytarsini and a possible homologue of the horn-like tip of the gonostylus known from several extant species of the genus *Stempellinella* Brundin. A key to determination of all genera and species of the Tanytarsini recorded in the Eocene is presented. Notes on evolutionary trends in the tribe are also provided.



## 1. Introduction

The Chironomidae is a large extant family of aquatic dipterans distributed worldwide. A recent inventory indicates over 7000 chironomid species (Pape et al., 2011), but it is assumed that their number may reach even 15,000 species (Cranston, 1995). The Tanytarsini is one of the three tribes of the subfamily Chironominae, which has been proposed to be divided in two subtribes: the Zavreliina Sæther, 1977 (= Stempellinina Shilova, 1976) and the Tanytarsina Zavřel, 1917 (Sæther, 1977; Sæther and Roque, 2004). The higher level internal relationships within the Chironomidae were recently reviewed by Cranston et al. (2012).

The Tanytarsini develop mainly in freshwaters. Some genera are known to dwell in lotic habitats (e.g., *Rheotanytarsus* Thienemann et Bause, 1913), while others inhabit various types of lentic environments (e.g., *Cladotanytarsus* Kieffer, 1921; *Stempellina* Thienemann et Bause, 1913; or most species of the genus *Tanytarsus* van der Wulp, 1874). Numerous tanytarsine species have a narrow tolerance range for temperature changes, trophy, salinity or acidity, making them important bioindicators of environmental changes and/or water quality (e.g., Brodersen and Lindegaard, 1999; Verneaux and Verneaux, 2002). Fossil remains of larvae accumulated in lake sediments are increasingly being used to reconstruct environmental changes that affected lakes and their watersheds in the past (e.g., Velle et al., 2005; Verschuren and Eggermont, 2006).

The oldest representative of the family Chironomidae, *Aenne triassica* is dated back to 202 Ma ± 1 Myr (Late Triassic; Krzemiński and Jarzembowski, 1999), whereas the subfamily Chironominae, including the Tanytarsini, is suggested to appear in the Cretaceous (Ekrem, 2003; Doitteau and Nel, 2007). Cranston et al. (2012) in their recent phylogenetic work date back the Tanytarsini to the beginning of the Upper Cretaceous based on molecular clock. However, these results still wait for confirmation from the fossil record, since the oldest and only known unspecified representative of Chironominae has been discovered in Taimyr amber (Upper Cretaceous, ~ 85–87.5 Ma; Kalugina, 1974). The Tanytarsini have not been recorded in the Early Eocene amber of France dated back to ~ 53 Ma (Doitteau and Nel, 2007); thus the oldest Tanytarsini known to date are found in the Middle Eocene Baltic amber (~ 40–45 Ma). Phylogenetic relationships and systematic division within the tribe Tanytarsini are still unclear, as very few species of these dipterans have been reported from the fossil record so far (Seredszus and Wichard, 2007; Giłka, 2010, 2011a; Giłka et al., 2013; Zakrzewska and Giłka, 2013). On the one hand, this may be due to relatively low fossil species richness, but this may also result from the poor preservation of fossils and/or the troublesome preparation of minute amber inclusions and examination of very tiny diagnostic structures. Indeed, our inventories indicate that the majority of the oldest

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