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A peculiar leg structure in the first non-biting midge described from Cambay amber, India (Diptera: Chironomidae)

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ABSTRACT: We present the first specific record of a chironomid of the tribe Tanytarsini from early Eocene Cambay amber, India (54 Ma). The oldest known extinct tanytarsine genus, *Gujaratomyia* Giłka & Zakrzewska, gen. nov., is described on the basis of adult males of *G. miripes* Giłka & Zakrzewska, sp. nov. The species displays an unusual leg structure with unique leg ratios and tibial armature. The combination of the head and genital apparatus characters supports the hypothesis that *Gujaratomyia* and *Cladotanytarsus* are members of a common group within the subtribe Tanytarsina.

KEY WORDS: early Eocene, fossils, functional anatomy, new genus, Tanytarsini, taxonomy.

Today, Chironomidae have a worldwide distribution, with more than 7,000 species (Pape *et al.* 2011). This family also has a rich fossil record, with the oldest finding, *Aenne triassica* Krzemiński & Jarzembowski, 1999 dating back to the Upper Triassic (~202 Ma; Benton & Donoghue 2007). Non-biting midges are commonly recorded in ambers of various origin: from the Cretaceous (e.g., in Lebanese amber; Veltz *et al.* 2007), through the Eocene (e.g., in Sakhalin amber; Baranov *et al.* 2015) to the Miocene (e.g., in Amazonian amber; Antoine *et al.* 2006). The vast majority of species of the chironomid tribe Tanytarsini have so far been described from extensively examined Baltic amber (~43–48 Ma; Seredszus & Wichard 2007; Giłka 2010, 2011a; Giłka *et al.* 2013; Zakrzewska & Giłka 2013, 2014, 2015a, b; Zakrzewska *et al.* 2016), whereas the oldest known member of this tribe is *Nandeva pudens* Giłka, Zakrzewska, Baranov, Wang & Stebner, 2016, found in Chinese Fushun amber (~50–53 Ma; e.g., Wang *et al.* 2014); however, this fossil belongs to the genus that is presumably either a member of the Tanytarsini or is defined as the tribe's sister group (Giłka *et al.* 2016).

Cambay amber is found in several active opencast lignite mines located in the state of Gujarat, India, about 30 km northeast of Surat. The amber occurs in lignitic and mud-dominated sediments, which were deposited in a near-shore chenier plain system where the sediment input was seasonal (e.g., McCann 2010). Cambay amber has been dated to the early Eocene (54 Ma; *cf.* Smith *et al.* 2016, Stebner *et al.* 2017a); it is thus contemporaneous with Fushun amber from China and slightly older than amber from the Baltic region. Furthermore, Cambay amber was formed at a time of expanding modern diversity, at the beginning of the Early Eocene Climatic Optimum (EECO) and just after the Late Palaeocene Thermal Maximum (LPTM) (e.g., Zachos *et al.* 2008).

As in many other amber deposits, Chironomidae are the most common dipteran inclusions in Cambay amber, in which five subfamilies have been found so far. With nearly 50 % of all chironomids recorded, Chironominae (including the tribe Tanytarsini) is the most abundant, followed by Orthocladiinae, Tanypodinae, Podonominae and Prodiamesinae. The Tanytarsini is represented by three extant genera: *Stempellina* Thienemann & Bause in Bause, 1913; *Stempellinella* Brundin, 1947; and *Tanytarsus* van der Wulp, 1874 (Stebner *et al.* 2017b); however, no specific description has been published so far. Therefore, a species of an unknown extinct genus presented below is the first tanytarsine and non-biting midge described from early Eocene Cambay amber.

1. Material and methods

The specimens examined are adult male chironomids preserved in early Eocene Cambay amber from India (54 Ma), derived from the Tadkeshwar lignite mine. The inclusions are part of the collection of the Birbal Sahni Institute of Palaeosciences (BSIP), Lucknow, India. The amber was ground using a Buehler Phoenix Beta grinding machine and polished manually. Measurements of specimens are in micrometres, except for the total length (in millimetres, rounded off to the first decimal digit). The body length was measured from the antennal pedicel to the end of the gonostylus, and the wing from the arculus to the tip. Lengths of leg segments and palpomeres were rounded off to the nearest 5 μm and 1 μm, respectively. The antennal, leg and venarum ratios (AR, LR, VR) were calculated to the second decimal place. The morphological terminology and abbreviations follow Sæther (1980). The photographs were taken using the microscope PZO Biolar SK14 and Helicon Focus 6 image stacking software.

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