

Minute and diverse in fossil sticky stuff: Tanytarsini (Diptera: Chironomidae) from early Eocene Indian Cambay amber

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Received 17 July 2019; revised 23 October 2019; accepted for publication 5 November 2019

We here present a pioneering systematic review of fossil dipterans of the tribe Tanytarsini (family Chironomidae) discovered in Indian amber from Cambay. The specimens examined belong to five species: *Gujaratomyia miripes*, *Stempellina stebneri* sp. nov., *Stempellinella pollex* sp. nov., *Tanytarsus forfex* sp. nov. and *Tanytarsus ramus* sp. nov., which are described. All species belong to the oldest known Tanytarsini and come from the Cambay shale formation in Tadkeshwar, dated to the early Eocene (~54 Mya). Displaying unusual characters/structures of diagnostic and phylogenetic importance, the specimens studied are discussed against the background of the evolution and systematics of the oldest fossil (Eocene) and extant representatives in the tribe. An updated checklist and key to the identification of genera and species of Tanytarsini from Eocene amber is also provided. The spectral characteristics and physical properties of Cambay amber are similar to those of glessite resins, which are discussed in detail in order to substantiate the identity of the amber and the origin of the inclusions studied.

ADDITIONAL KEYWORDS: amber identification – Eocene – Fourier transform infrared spectroscopy – new species – non-biting midges – systematics.

INTRODUCTION

THE OLDEST CHIRONOMIDAE AND THE TANYTARSINI

The Chironomidae, commonly known as non-biting midges, are a large and diverse family of mostly aquatic dipterans. On the basis of a summary by Pape *et al.* (2011) and data published afterwards, the number of chironomid taxa is approaching 7500 species and 550 genera. This family is divided into 12 subfamilies, with the second largest, Chironominae, comprising three tribes: Chironomini, Pseudochironomini and Tanytarsini. The last is probably one of the most diverse,

but consists of minute midges. Extant Tanytarsini can be found worldwide, but some species are endemic to tropical or mountain areas. Adults can often be observed in huge swarms, which in humans can give rise to allergic symptoms that may develop into diseases of the respiratory system (Cranston *et al.*, 1981; Hirabayashi *et al.*, 1997; Gilka, 2009). Their larvae and pupae inhabit all types of freshwater bodies and, because they are often associated with a specific habitat, have proved to be useful indicators of extant, subfossil or fossil aquatic environments (e.g. Stebner *et al.*, 2017).

The oldest species of the family Chironomidae, *Aenne triassica* Krzemiński & Jarzembowski, 1999, comes from Upper Triassic deposits (~202 Mya; Krzemiński & Jarzembowski, 1999; Benton & Donoghue, 2007). It is followed by specimens preserved as Jurassic and Cretaceous rock impressions (e.g. Kalugina, 1980a, 1985, 1986, 1993; Zhang, 1991; Lukashevich & Przhiboro,

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[Version of record, published online 3 January 2020; <http://zoobank.org/urn:lsid:zoobank.org:pub:74FC7C16-C9EB-49F5-9E63-208751C04B65>]