



Fossil Bibionidae (Diptera: Bibionomorpha) from the late Oligocene of Bes-Konak, Anatolia, Turkey

JOHN SKARTVEIT & ANDRÉ NEL

John Skartveit, NLA University College, Postboks 74, N-5812 Bergen, Norway. E-mail : John.Skartveit@NLA.no

André Nel, CNRS UMR 7205, CP 50, Entomologie, Muséum national d'Histoire naturelle, 45 Rue Buffon, F-75005, Paris, France.

E-mail: anel@mnhn.fr

Abstract

Three new species of bibionid flies are described from the late Oligocene deposit of Bes-Konak, Anatolia, Turkey: *Biblio anatolicus* sp.n., *Biblio nigricosta* sp.n. and *Penthetria beskonakensis* sp.n. These genera are associated with temperate climate, contrasting with the bibionid Oligocene fossils from some other European localities with warmer climates, where the intertropical genus *Plecia* often predominates.

Keywords: *Biblio*, *Penthetria*, Cenozoic, palaeoclimatic indicators

Introduction

A large number of bibionid flies have been described from the European Cenozoic lacustrine outcrops (e.g. Heer 1856, Oustalet 1870, Théobald 1937, Piton 1940, Statz 1943, Gentilini 1991a,b, Nel 1994, 2007, Gee *et al.* 2001, Skartveit 2009), where bibionids often constitute a large percentage of the insect remains (Collomb *et al.* 2008). However, in the past many species have been described based partly on preservation artifacts rather than traits of the original specimens (Collomb *et al.* 2008); unfortunately different authors who have been working on material from the same areas had not had studied type material of already described species before proceeding to describe new ones. For this reasons, the number of species names in the literature (see Evenhuis 1994 for a catalogue) is probably a considerable overestimate of the number of species present in the outcrops studied.

Up till now, no Cenozoic bibionids have been described from the area between Radoboj in Croatia (Heer 1849) and China (Zhang 1989, Zhang *et al.* 1994) and the Amur area of Russia, except from a single species from the Miocene of Euboea, Greece (Handlirsch 1906–1908, Bachmayer *et al.* 1971). Unidentified fossil bibionids have been recorded from the Pliocene of Turkmenistan (Rohdendorf 1964). This paper aims to document the fossil bibionids found at a late Oligocene locality in Anatolia, Turkey.

Material and methods

Outcrop of Bes-Konak. Thanks to the works of Dr Jean-Claude Paicheler and his colleagues, it is possible to study the rich entomofauna of the Latest Oligocene volcano-sedimentary paleolake of Bes-Konak (diatomite sediments, Gürçü-Dere Valley, Anatolia, Turkey) (Paicheler 1978, 1988; Paicheler *et al.* 1978, 2007). The fauna is especially well preserved, including a total collection of 3,784 fossil insects, 771 aquatic Heteroptera (*Notonecta* spp., Corixidae) (20.4%), relatively few aerial or terrestrial insects (mainly Bibionidae), less abundant Coleoptera, Hemiptera, Formicidae, and few adult Odonata. Among vertebrates, larvae of *Pelobates* sp. are also very numerous, with a few metamorphosed instars and adults of Ranidae and Urodela: Trituridae. Numerous leaves, seeds and vegetal fragments corresponding to a close woodland environment, dense and diversified (forest ponds) and composed of a large amount of hygrophilous taxa, such as *Myrica*, *Salix* and *Zelkova*, and some limnophytic taxa such