



Further records of biting midges (Diptera: Ceratopogonidae) from Upper Cretaceous Burmese amber (Myanmar)



Ryszard Szadziewski^{a,*}, Andrew Ross^b, Wojciech Giłka^a

^aDepartment of Invertebrate Zoology and Parasitology, University of Gdańsk, Wita Stwosza 59, 80-308 Gdańsk, Poland

^bNational Museum of Scotland, Department of Natural Sciences, Chambers St., Edinburgh EH1 1JF, United Kingdom

ARTICLE INFO

Article history:

Received 20 January 2014

Accepted in revised form 5 February 2014

Available online 14 March 2014

Keywords:

Diptera

Ceratopogonidae

Upper Cretaceous

Burmese amber

New species

ABSTRACT

A new biting midge *Archiculicoides andersoni* sp. nov. from Upper Cretaceous Burmese amber is described and illustrated. An unknown male of *Leptoconops myanmaricus* Szadziewski, 2004 is described and an undetermined female of the genus *Archiaustroconops* and *Austroconops* in the collection of National Museums Scotland is reported. A key for the determination of 10 named species in 6 genera of biting midges reported from Burmese amber is also provided.

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1. Introduction

The fossil record of Ceratopogonidae is one of the best known of all Diptera. There are presently 6243 named species with fossils representing 4.2% of these (Borkent, pers. comm.). The family is well documented from the Lower Cretaceous to the Neogene. From the Lower Cretaceous they are reported as inclusions from Lebanese ambers (Szadziewski, 1996; Borkent, 2000, 2001), Jordanian amber (Szadziewski, 2000), Spanish ambers (Szadziewski & Arillo, 1998, 2003; Pérez-de la Fuente et al., 2011), Charentese amber from France (Choufani et al., 2011), and as a compression fossil from England (Borkent et al., 2013). From the Upper Cretaceous, biting midges are reported from Canadian, Siberian, New Jersey, French and Burmese amber (Szadziewski, 1996, 2004; Szadziewski & Poinar, 2005; Borkent, 2000; Pérez-de la Fuente et al., 2011; Choufani et al., 2013).

The perceived age of Burmese amber or Burmite from Myanmar has changed considerably in its history. It was first considered as Miocene (Noetling, 1892), then Eocene (Cockerell, 1922), then more recently as Albian (Lower Cretaceous) in age (see Ross et al., 2010), however it was recently dated as Cenomanian (Upper Cretaceous) by Shi et al. (2012).

Cockerell (1919) briefly described from Burmese amber the well-preserved male of *Johannsenomyia swinhoei* and this holotype

was photographed by York in Ross and York (2000). Subsequently *Johannsenomyia swinhoei* Cockerell was redescribed and assigned to the extinct genus *Atriculicoides* Remm, 1976 (Szadziewski, 2004).

Rasnitsyn and Ross (2000) reported 12 biting midges (Ceratopogonidae) among 1198 arthropods in 117 Burmese amber pieces preserved at The Natural History Museum, London. These biting midges (14) were studied by the senior author who described four new species in two extant genera: *Austroconops* Wirth & Lee and *Leptoconops* Skuse (Szadziewski, 2004).

A collection of inclusions in Burmese amber purchased by the American Museum of Natural History, New York, includes 204 biting midges among 3012 arthropods (Grimaldi et al., 2002). Further specimens of biting midges in Burmese amber were purchased by George O. Poinar and deposited at Oregon State University. This collection of 22 specimens was studied by Szadziewski and Poinar (2005).

Up to date nine named species of biting midges have been reported from Burmese amber in the genera *Austroconops* (1), *Archiaustroconops* (2), *Leptoconops* (4), *Protoculicoides* (1) and *Atriculicoides* (1) (Cockerell, 1919; Szadziewski, 2004; Szadziewski & Poinar, 2005).

A small new collection of Burmese amber inclusions was purchased by the National Museums Scotland (NMS) from Scott Anderson. Some of the specimens in this collection were figured by Ross et al. (2010) and Ross and Sheridan (2013). This collection contains four biting midge specimens, and they are the subjects of the present study.

* Corresponding author.

E-mail addresses: ryszard.szadziewski@biol.ug.edu.pl (R. Szadziewski), A.Ross@nms.ac.uk (A. Ross), wojciech.gilka@biol.ug.edu.pl (W. Gilka).