Cretaceous Research 56 (2015) 274–277

Contents lists available at ScienceDirect

Cretaceous Research

journal homepage: www.elsevier.com/locate/CretRes

The first Mesozoic pleasing lacewing (Neuroptera: Dilaridae)

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ARTICLE INFO

Article history:
Received 5 May 2015
Received in revised form
28 May 2015
Accepted in revised form 2 June 2015
Available online 11 June 2015

Keywords:
Insecta
Neuroptera
gen. et sp. nov.
Phylogeny
Myanmar
Amber
Cretaceous
Cenomanian

ABSTRACT

Cretanallachius magnificus gen. et sp. nov., first Mesozoic and earliest record of the Dilaridae (Neuroptera), is described from the Cretaceous Burmese amber. Its putative closest relative is the recent subfamily Nallachiinae known by the sole genus *Nallachius*.

1. Introduction

The pleasing lacewings (Dilaridae Newman, 1853) are a small family of uncommon neuropteran insects with less than 70 described species distributed in Asia, Africa, Europe, and the Americas (Engel, 1999). The family can be readily recognized by the pectinate antennae of males, the exerted ovipositor of females, and the presence of three prominent tubercles on the vertex (Oswald, 1998). Members of this family frequently occur around dead wood. The family is currently divided into the two subfamilies Dilarinae Newman, 1853 and Nallachiinae Navás, 1914. The Nallachiinae currently comprises only the recent genus *Nallachius* Navás, 1909 while the Dilarinae comprises the three recent genera *Dilar* Rambur, 1838, *Berothella* Banks, 1934, and *Neonallachius* Nakahara, 1963. The dilarid fossil record is extremely scarce as these insects are only known from the Eocene Baltic amber by an undescribed female specimen (Weitschat and Wichard, 1998: pl. 56a,b), plus a male specimen that Engel (1999) described in the fossil dilarine genus and species *Cascadilar eocenicus*. Grimaldi and Engel (2005: 353) suggested to be a member of the recent genus *Dilar* (see also Makarkin and Tshistjakov, 2009). Makarkin (2002: 222) supposed that the family could be Jurassic or early Cretaceous while Winterton and Wiegmann (2009) and Winterton et al. (2010) proposed a Triassic age for this family. Here we describe the earliest record of Dilaridae from the Cretaceous Burmese amber, representing a new genus and species. This fossil taxon constitutes the sister group of the modern genus *Nallachius*.

2. Material and method

The fossil was examined and measured using an incident light stereomicroscope (Olympus SZX9) and a stereomicroscope (Nikon SMZ 1500), and a Leitz Wetzlar binocular microscope. Observations and photographs were taken using a Zeiss Discovery V20 stereo microscope and a Zeiss Axio Imager Z2 light microscope with a digital camera (AxioCam HRc) attached respectively. Images were then digitally compiled using Helicon Focus software, and treated with Adobe Photoshop.

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http://dx.doi.org/10.1016/j.cretres.2015.06.001
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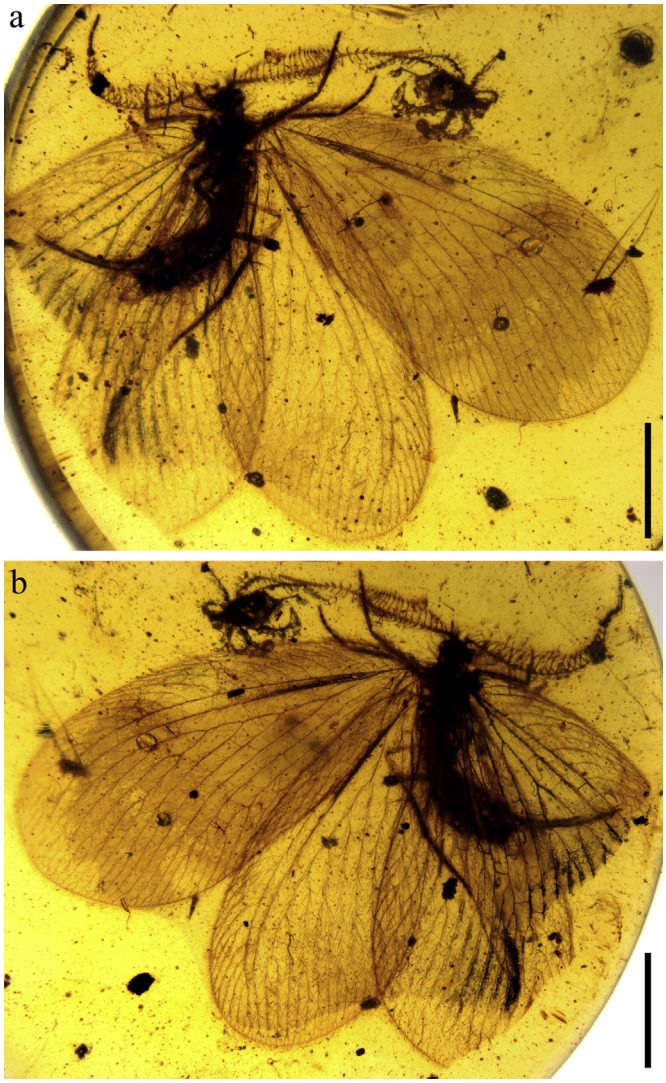

Fig. 1. *Cretanallachius magnificus* gen. et sp. nov., holotype NIGP162229, photographs of habitus. a, dorsal view; b, ventral view. Scale bars represent 2 mm.

The fossil comes from the Hukawng Valley, Kachin State, Myanmar (Burma). The exact locality at which this specimen was collected cannot be determined, as it was acquired from fossil traders. The amber piece was grounded and polished in order to make all the anatomical features of the inclusion available for observation. Until recently, the precise age of the amber of Myanmar (Burmite) has been elusive. Recently an absolute age of 98.79 ± 0.62 Ma (earliest Cenomanian) was given for the Burmese amber based on U–Pb dating of zircons (Shi et al., 2012). Nevertheless this amber could be older, as frequently amber pebbles from this origin underwent surface perforation, suggesting that the amber was already hardened when deposited. The history of this amber has been reviewed by various authors (see Cruickshank and Ko, 2003). This deposit arguably contains the greatest diversity of inclusions among the Cretaceous ambers (Grimaldi et al., 2002). A map of the area where the amber has been found is available in Dong et al. (2015).

We follow the classification of Dilaridae as proposed by Oswald (1998). The nomenclature of wing venation is that of Engel (1999). Abbreviations for wing venation are as follow: Sc = subcosta; R1 = first branch of radius; Rs = radial sector; MA = media anterior; MP = media posterior; Cu = cubitus.

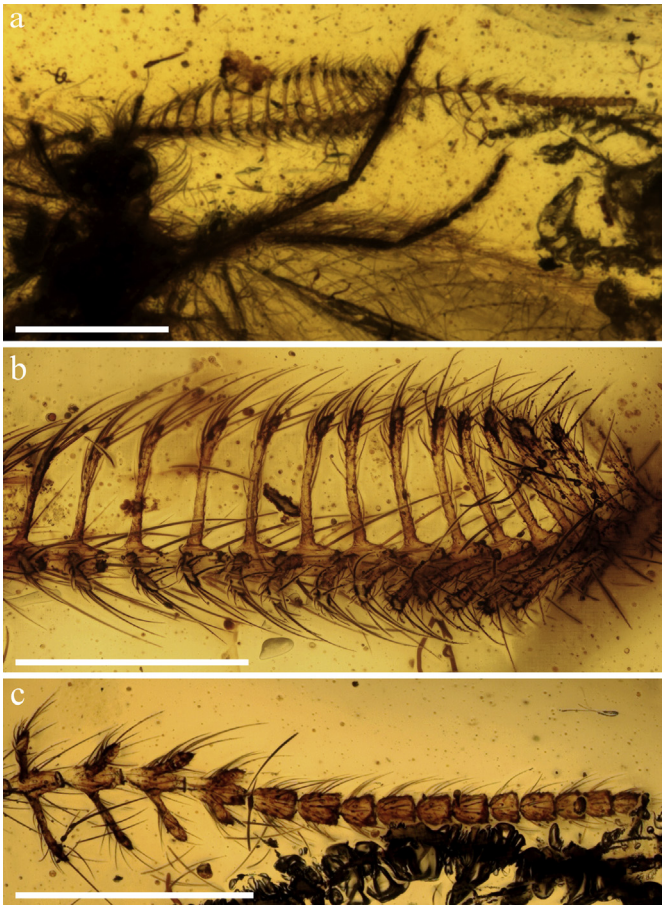

Fig. 2. *Cretanallachius magnificus* gen. et sp. nov., holotype NIGP162229, photographs of antenna. a, general view; b, detail of mid part; c, apex. Scale bars represent 1 mm in (a) and 500 μm in (b) and (c).

3. Systematic palaeontology

Order Neuroptera Linnaeus, 1758.
Family Dilaridae Newman, 1853.
Subfamily Nallachiinae Navás, 1914.
Genus *Cretanallachius* gen. nov.
Type species. *Cretanallachius magnificus* sp. nov.

Etymology. Named after the Cretaceous period and the genus *Nallachius*. Gender masculine.

Diagnosis. Forewing vein MA ending on radial stem basal of separation of R1 from Rs and not reemerging distally independently from Rs; male with more than 10 apical antennomeres lacking lateral process while those with lateral processes are bipectinate.

Cretanallachius magnificus sp. nov. (Figs. 1–8).

Etymology. Named after the wonderful state of preservation of the type specimen.

Material. Holotype specimen NIGP162229, stored in the collection of the Nanjing Institute of Geology and Paleontology, Academia Sinica (NIGP), China.

Horizon and locality. Lowermost Cenomanian (Shi et al., 2012), Tanai Village, Hukawng Valley, northern Myanmar.

Diagnosis. As for the genus (*vide supra*).

Description. Male: total body length ca. 4.5 mm (excluding antennae). Forewing length 8.0 mm, width 4.0 mm. Hind wing length 6.9 mm, width 3.6 mm. Head transverse, wider than long. Antenna 37-segmented; ca. 3.0 mm long, extending posteriorly approximately to 4/5 of distance to abdominal apex; scape roughly