

Short communication

A new damselfly (Odonata: Zygoptera: Platystictidae) from mid-Cretaceous Burmese amber

Daran Zheng ^{a, b, *}, Qingqing Zhang ^{a, c}, Su-Chin Chang ^b, Bo Wang ^{a, d}^a State Key Laboratory of Palaeobiology and Stratigraphy, Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, 39 East Beijing Road, Nanjing 210008, China^b Department of Earth Sciences, The University of Hong Kong, Hong Kong Special Administrative Region^c University of the Chinese Academy of Sciences, Beijing 100049, China^d Key Laboratory of Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, 1, Beichen West Road, Beijing 100101, China

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ABSTRACT

The genus *Mesosticta* Huang, Azar, Cai et Nel, 2015 was established based on the wing bases of two damselflies from mid-Cretaceous Burmese amber. Here we describe a new well-preserved platystictid damselfly, *Mesosticta electronica* sp. nov., with complete forewings and hindwings. The diagnosis of *Mesosticta* is revised and augmented in this paper. *Mesosticta electronica* sp. nov. differs from *Mesosticta burmatica* Huang, Azar, Cai et Nel, 2015 in having the arculus slightly distal of Ax2, a free subdiscoidal cell, the hindwing AA ending on the middle area of the posterior side of the discoidal cell, and the base of RP2 being three or four cells distal of the subnodus. The new discovery adds to the diversity of damselflies in mid-Cretaceous Burmese amber and puts the origin of Platystictidae to at least the mid-Cretaceous.

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1. Introduction

The recent family Platystictidae, known as forest damselflies or shadowdamsels, comprises eight genera in four subfamilies and is restricted to the tropics, viz. central and northern South America (subfamily Palaemnematinae) and tropical Southeast Asia (subfamilies Platystictinae, Protostictinae and Sinostictinae) (van Tol et al., 2009; Dijkstra et al., 2014; Schorr and Paulson, 2015; Suhling et al., 2015). The platystictid larvae live in small streams deep in the dark forest, while the adults prefer to hang from trees along the streams. The current distribution of platystictid damselflies can be dated back to the Late Cretaceous when the subfamilies Palaemnematinae and Platystictinae separated in the northern hemisphere (van Tol and Müller, 2003; van Tol et al., 2009). Platystictidae is attributed to a very basal position in Zygoptera and is certainly unrelated to Coenagrionidae and Platycnemididae (Poinar et al., 2010; Bechly, 2012). A recent molecular phylogeny indicates

that this family is monophyletic in the sister group of all Zygoptera excluding Lestoidea (Dijkstra et al., 2014). This family can be easily distinguished from the other members of Zygoptera by the presence of a 'basal post-cubital vein', i.e. CuP (Fraser, 1957; Jarzembowski et al., 1998).

A platystictid damselfly, *Mesosticta burmatica* Huang, Azar, Cai et Nel, 2015, has been recently described from mid-Cretaceous Burmese amber (Huang et al., 2015). The type species *M. burmatica* was established based on two incomplete damselflies (two-thirds of basal wing characters preserved). In this paper, we describe a new species of the genus *Mesosticta* based on a well-preserved damselfly with complete forewings and hindwings from mid-Cretaceous Burmese amber. The new specimen adds more information on the genus *Mesosticta* and further enhances the diversity of mid-Cretaceous damselflies in Burmese amber.

2. Material and methods

The specimen described herein was collected from the Hukawng Valley of Kachin Province, Myanmar (locality in Kania et al., 2015: fig. 1). The age of Burmese amber is radiometrically dated at

* Corresponding author. Department of Earth Sciences, The University of Hong Kong, Hong Kong Special Administrative Region.

E-mail address: dranzheng@gmail.com (D. Zheng).

98.79 ± 0.62 Ma (earliest Cenomanian; Cohen et al., 2013) based on U–Pb zircon dating of the volcanoclastic matrix (Shi et al., 2012).

The amber containing the damselflies is yellow and transparent. Photographs were taken using a Zeiss Stereo Discovery V16 microscope system and Zen software. In most instances, incident and transmitted light were used simultaneously. All images are digitally stacked photomicrographic composites of approximately 40 individual focal planes obtained using the free software Combine ZP for a better illustration of the 3D structures. The line drawings were prepared from photographs using image-editing software (Corel-Draw X7 and Adobe Photoshop CS6). The specimen is housed in the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences (NIGPAS).

The nomenclature of the dragonfly wing venation used in this paper is based on the interpretations of Riek (1976) and Riek and Kukalová-Peck (1984), as modified by Nel et al. (1993) and Bechly (1996). The higher classifications of fossil and extant Odonoptera, as well as family and generic characters followed in the present work, are based on the phylogenetic system proposed by Bechly (1996). Wing abbreviations are as follows: AA, anterior anal; AP, posterior anal; Arc, arculus; Ax, primary antenodal crossvein; Cr, nodal crossvein; CuA, cubitus anterior; CuP, cubitus posterior; DC, discoidal cell; IR, intercalary radial vein; MA, median anterior; MP, median posterior; N, nodus; Pt, pterostigma; RA, radius anterior; RP, radius posterior; ScP, subcosta posterior; Sn, subnodal crossvein. All measurements are given in mm.

3. Systematic palaeontology

Order Odonata Fabricius, 1793

Suborder Zygoptera Selys-Longchamps, 1854
Family Platystictidae Laidlaw, 1924

Genus *Mesosticta* Huang, Azar, Cai et Huang, 2015

Type species: *Mesosticta burmatica* Huang, Azar, Cai et Huang, 2015; other species *Mesosticta electronica* sp. nov.

Emended diagnosis. For both forewing and hindwing: base of RP3/4 just basal of Sn; base of RP2 three or four cells distal of Sn; MA long but ending two cells distal of level of base of IR1; MP three or four cells long; CuP in basal position; presence of crossvein basally closing subdiscoidal cell, different from CuP; subdiscoidal cell posteriorly closed by AA and not by posterior wing margin; RP1 with slight angle below pterostigmal brace; IR1 three cells distal of base of RP2, nearer to Pt than to base of RP2; postnodal and postsubnodal crossveins aligned slightly distal of N and basal of base of IR1; longitudinal veins RA, RP1, IR1, RP2 and IR2 strongly converging to wing apex; Pt one cell long, thickened and fused with strongly thickened pterostigmal part of RA to U-shaped structure.

Remarks. The genus *Mesosticta* was tentatively attributed to the Platystictidae Laidlaw, 1924 due to showing one putative apomorphy, two small veins present in the space between MP + Cu and the posterior wing margin in the petiole, although it cannot be attributed to any recent platystictid genus by not sharing a very long IR1 and a very different subdiscoidal area (Huang et al., 2015).

Mesosticta electronica sp. nov.

Figs. 1–5

Etymology. Name after the Greek word electron for ‘amber’.

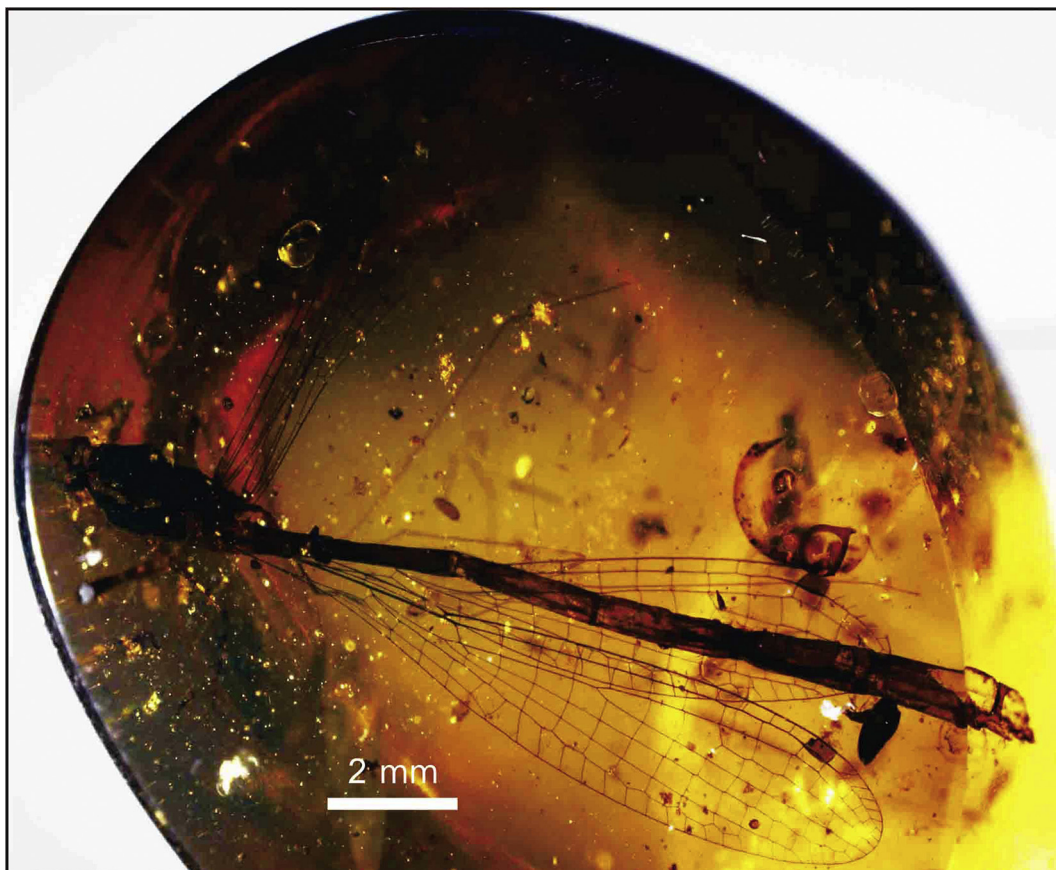


Fig 1. *Mesosticta electronica* sp. nov., holotype, NIGP163685, photograph of specimen.

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