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Short communication

Discovery of the first hydraenid beetle in amber, with description of a new genus and species (Coleoptera: Staphylinoidea: Hydraenidae)

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ABSTRACT

The first fossil of the family Hydraenidae preserved in amber is described: *Archaeodraena cretacea* Jäch & Yamamoto, gen. et sp. nov. The description is based on a well-preserved adult found in Cretaceous amber from northern Myanmar (Burma). In general appearance, the new genus superficially resembles the extant genus *Hydraena* Kugelann, which is the largest water beetle genus in the world. The markedly long maxillary palpi and the presence of a fringe of long thin metatarsal setae in *A. cretacea* may imply that this extinct species was actually living in an aquatic habitat.

1. Introduction

Hydraenidae, or minute moss beetles, are one of the most diverse, but still rather poorly studied families of predominantly aquatic and riparian Coleoptera (Jäch & Balke, 2008; Freitag, 2014). They are defined by the following characteristics: small size (0.8–4.2 mm length), elongate or drop-shaped body form, moderately long or markedly long maxillary palpi, antennae often of "hydrophiloid" type (but in contrast to hydrophilids, pubescent club composed of five antennomeres), presence of an intercoxal sternite between metacoxae, abdomen usually with seven ventral sclerites (males: sternites III–VIII, and "terminal sternite"; females: sternites III–VIII, and gonocoxite); for details about hydraenid morphology and hydraenid autapomorphies, see Jäch et al. (2016). A generic overview of the family was published by Hansen (1991), and a world catalogue was published by Hansen (1998). Hydraenidae are a monophyletic group within Staphylinoidea, generally considered as a sister group of the feather-winged beetle family Ptiliidae (Lawrence et al., 2011; McKenna et al., 2015a,b). Currently, Hydraenidae are divided into four subfamilies: Hydraeninae, Ochthebiinae, Orchymontiinae, and Prosthetopinae, however, recent DNA studies suggest a very different subfamily classification (Jäch et al., 2016).

Hydraenidae are among the oldest known extant water beetle families (Ponomarenko & Prokin, 2015). The oldest known representative of the family is *Ochtebiites minor* Ponomarenko, described from the Lower Jurassic in Russia (Lyagush'ye (Chernyy Etap 1), a Pliensbachian terrestrial horizon in the Abasheva Formation, 190.8–182.7 Ma). The second oldest representative of the family is *Ochtebiites altus* Ponomarenko from Novospasskoe, Russia (Lower Jurassic, Ichetui Formation, ca. 150–160 Ma) (Ponomarenko, 1977, 2003). Other Upper Jurassic hydraenid fossils are known from Mongolia and Kazakhstan (Ponomarenko, 1977; Ponomarenko et al., 2014). Specimens from the Lower Cretaceous were collected in Australia and Mongolia (Ponomarenko, 1980; Jell & Duncan, 1986). Two hydraenid fossils have been recorded from the Paleogene and one from the Neogene (Table 1). Hydraenid fossils are rather prevalent in Quaternary deposits of the United Kingdom and North America (e.g., Elias, 2014; Elias & Matthews, 2014). Pre-Quaternary hydraenid fossils are scarce, and they were so far all confined to compression fossils belonging to three genera (Table 1). Hence, no species has so far been described from morphologically informative amber fossils.

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Table 1
Checklist of the pre-Quaternary fossil Hydraenidae (Coleoptera: Staphylinoidea) of the world.

Taxon	Horizon	Locality	Preservation	Key references
†*Archaeodraena* Jäch & Yamamoto, gen. nov.				
†*Archaeodraena cretacea* Jäch & Yamamoto, sp. nov.	Upper Cretaceous	Hukawng, Myanmar	Amber	Present study
Hydraena Kugelann, 1794				
†*Hydraena* (s.str.) *reidiana* Lesne, 1920	Pliocene	Castle Eden, Durham, UK	Compression	Lesne, 1920
†*Ochtebiites* Ponomarenko, 1977				
†*Ochtebiites minor* Ponomarenko, 1985	Lower Jurassic	Lyagush'ye, Russia	Compression	Ponomarenko, 1985
†*Ochtebiites altus* Ponomarenko, 1977	Lower Jurassic	Novospasskoe, Russia	Compression	Ponomarenko, 1977, 2003
†*Ochtebiites incertus* Ponomarenko, 1977	Upper Jurassic	Karatau, Kazakhstan	Compression	Ponomarenko, 1977
†*Ochtebiites manlaicus* Ponomarenko, 1980	Lower Cretaceous	Manlay, Mongolia	Compression	Ponomarenko, 1980
Ochthebius Leach, 1815				
†*Ochthebius nitidulus* (Heer, 1870)*	Paleocene	Svalbard, Norway	Compression	Heer, 1870; Birket-Smith, 1977
†*Ochthebius plutonis* Heyden & Heyden, 1866	Oligocene	Rott, Germany	Compression	Heyden & Heyden, 1866
Hydraenidae indet.	Upper Jurassic	Shar Teg, Mongolia	Compression	Ponomarenko et al., 2014
Hydraenidae indet.	Lower Cretaceous	Koonwarra, Australia	Compression	Jell & Duncan, 1986

*Legalov (2015) followed the systematic placement of the original description of this taxon and placed it under the weevil family Curculionidae (Curculionoidea).
†: fossil taxa.

Here, we describe a remarkable new genus and species, based on a well-preserved specimen from Upper Cretaceous (lowermost Cenomanian) amber found in northern Myanmar.

2. Material and methods

This study is based on a single hydraenid specimen embedded in a piece of Upper Cretaceous amber (burmite) from the Hukawng Valley, Kachin State, northern Myanmar (Burma). Recent mining in this region has been limited to the Noije Bum mines (Fig. 1) (26°14′N 96°33′E) (Grimaldi et al., 2002; Cruickshank & Ko, 2003). The mine consists of a variety of clastic sedimentary deposits with thin limestone beds and abundant coaly and carbonaceous materials. The amber, which is associated with a narrow horizon in fine-grained facies, can be dated to the early Cenomanian (98.79 ± 0.62 Ma), based on radioisotope dating of zircon crystals obtained from the amber matrix (Shi et al., 2012). The amber has highly diverse inclusions; Ross et al. (2010) listed 36 orders, 216 families, and 228 species of arthropods. However, since that publication, the number of arthropod families detected has already increased to 252, making it the richest Cretaceous fossil resin arthropod assemblage known to date (Rasnitsyn et al., 2016). New reports concerning the burmite arthropods are appearing almost daily.

The holotype was originally preserved in an elliptical, medium-sized piece of amber (Fig. 2A; 11.8 × 19.5 × 7.4 mm). To permit

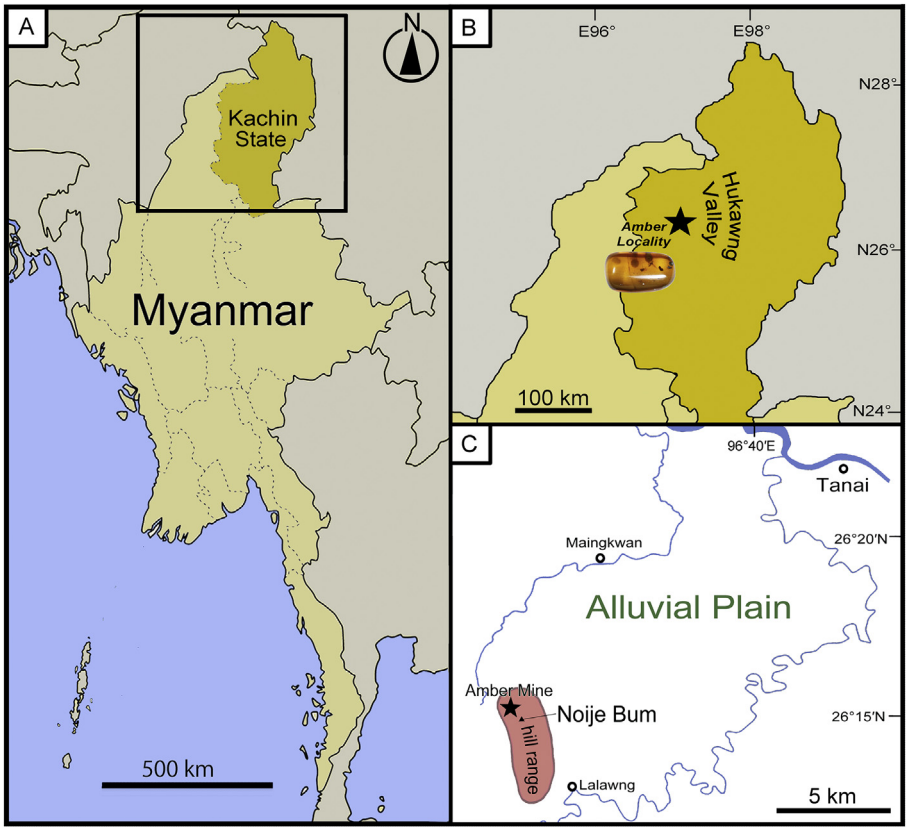

Fig. 1. A, Map of Myanmar (Burma) showing the amber locality (Hukawng Valley, Kachin State, northern Myanmar) where the new taxon has been collected; B, map of Kachin State; C, detailed map of the Hukawng Valley (after Cruickshank & Ko, 2003).