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The first record of Cretaceous ground beetle (Coleoptera: Carabidae: Oodini) from Burmese amber

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ABSTRACT

The first fossil Carabidae from Burmese amber is described as new to science, *Oodes kachinensis* Liu n. sp., based on a single individual preserved in Cretaceous amber from Myanmar. This species is placed in the extant tribe Oodini as supported by several characters: one supraorbital seta at each side of vertex, interval 9 very narrow, stria 8 very deep, epipleuron plica presented, antennomeres 1–3 glabrous and 4–11 densely pubescent. This new species has surprising long legs, indicating most probably it was living on the bank of puddle.

1. Introduction

The first amber Carabidae was reported from Baltic amber in 1810 (Giebel, 1856). To date, more than a hundred of Carabidae species have been mentioned from Baltic amber and Dominican amber (Kirejtshuk and Ponomarenko, 2013). For Myanmar amber, Grimaldi mention a species of ground beetle in 2002 by an uncertain larva.

Oodes Bonelli, 1809 is one of the extant genera included in the tribe Oodini of family Carabidae (Ball, 1977). This genus was erected for adults with oval body, almost glabrous, mesoscutellum visible, elytral stria 8 very deep, interval 8 very narrow, almost invisible, hind angles glabrous without setae, and epipleuron interrupted (crossed) near apex. To date, more than 52 *Oodes* species have been described, but none is fossil. It is distributed in all zoological regions except South America.

2. Materials and methods

The specimen was from amber deposits in the Hukawng Valley of Myanmar, currently considered to be of earliest Cenomanian age (*ca*. 99 Ma; Shi et al., 2012). The mining is done at Noije Bum, near Tanai Village (26°21′33.41″N, 96°43′11.88″E) (e.g., Cruickshank and Ko, 2003; Grimaldi et al., 2002). The type specimen is deposited in the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences, Nanjing, Jiangsu, China. It was prepared, including cut with a razor blade, polished with sand papers of different grain sizes and with diatomite mud, and mounted on transparent plastic slides. We measured the fossil specimens and extant specimens. Measurements were made with the aid of a Nikon SMZ1500 stereoscopic dissecting microscope with a micrometer. Body length (BL) was measured as the linear distance along the midline from the apex of the longer mandible to the apex of the longer elytron. Other measurements, and abbreviations used for them in this paper, are as follows: HW = maximum head width including the eyes; EYL = eye length measured along the longitudinal diameter of the eye (dorsal–lateral view); PL = length of pronotum measured along median line; PW = pronotum width at its widest point; EL = elytron length from base to apex; EW = width across both elytra at widest point (equal to body width); a1 = antennomere 1; a2 = antennomere 2; a3 = antennomere 3; LL = hind leg length; TT = hind tarsus/hind tibiae.

Wherever we refer to abdominal ventral plates, we use the numbering system that recognizes the generally accepted segmental homologies in Carabidae. All amber materials are checked in the 50–75% alcohol for eliminating the reflect light of surface. This method is only applied to yellow Burmese amber. All photographs

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were taken through a Nikon stereoscopic dissecting micro-scope fitted with a Canon 450D camera and Large depth-of-field 3D Digital Microscope (Keyence VHX-1000C). We took series of images with different foci, and synthesized them to one image with larger field depth by Helicon Focus and Photoshop CS4 software. Line drawings were made with the aid of the software Photoshop CS4.

3. Systematic palaeontology

Family Carabidae Latreille, 1802
Subfamily Licininae Bonelli, 1810
Tribe Oodini LaFerte-Senectere, 1851
Genus *Oodes* Bonelli, 1810

Oodes kachinensis Liu, n. sp (Figs.1–3, 4A, B)

Diagnosis. Pronotum trapezoid, widest at base, front angles acute, hind angles acute, lateral margins unbordered, disk glabrous, basal foveae very flat, almost invisible; hind angles glabrous without setae. Leg long and thin (longer than the majority of modern *Oodes* species, we used the rate of hind tarsus and hind tibiae), tarsi much longer than tibiae; spur of tibia very long.

Etymology. The name of the new species refers to its type locality.

Holotype. Female. NIGP160533, Cretaceous, Myanmar: Kachin.

Occurrence. Earliest Late Cretaceous (*ca.* 99 Ma) amber from the village of Tanai, Hukawng Valley, northern Myanmar.

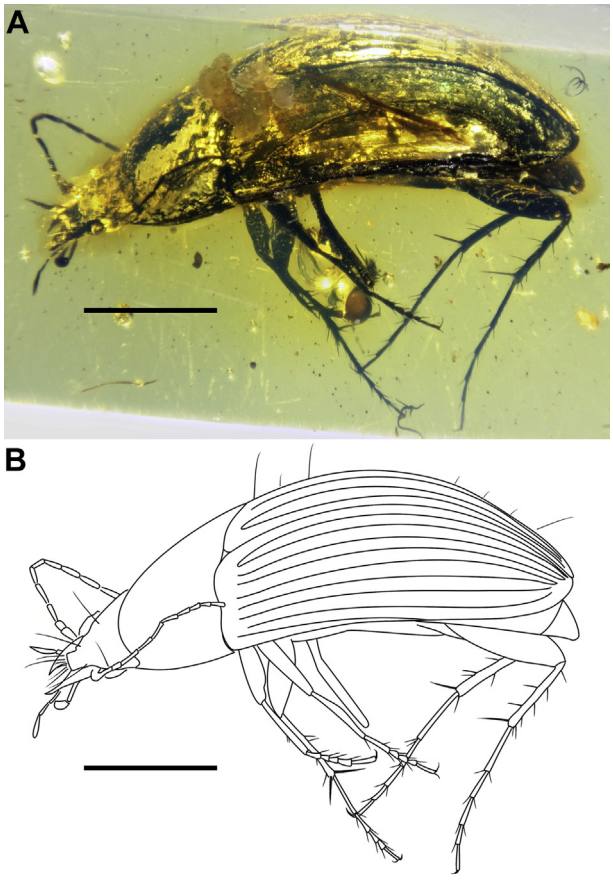

Fig. 1. *Oodes kachinensis* sp. nov. Left lateral view, NIGP160533. A, Holotype with highlight, showing some features of dorsal view. B, Line drawing of the holotype. Scale bars = 1 mm.

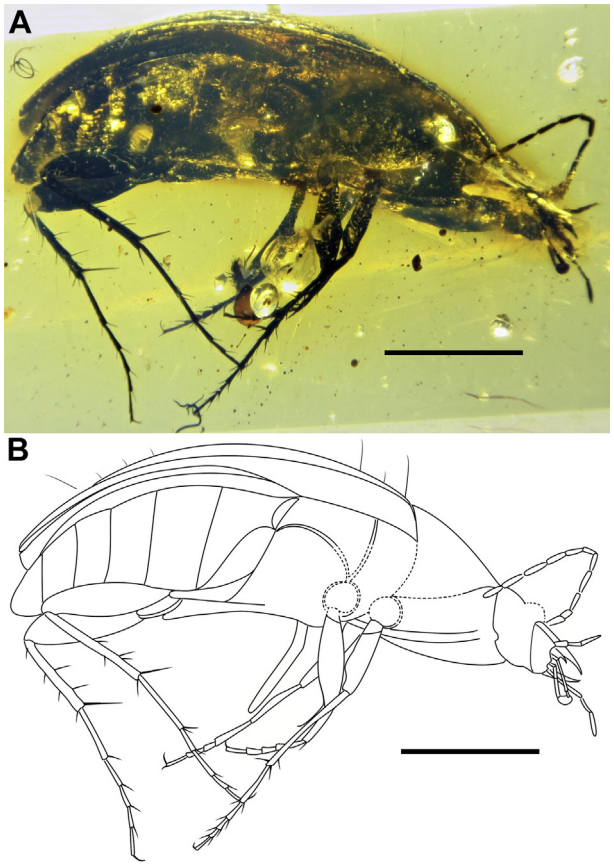

Fig. 2. *Oodes kachinensis* sp. nov. right-lateral view, NIGP160533. A, Holotype with highlight, showing some features of ventral view. B, Line drawing of the holotype. Scale bars = 1 mm.

Measurements. BL = 4.33 mm, HW = 0.85 mm, EYL = 0.25 mm, PL = 0.82 mm, PW = 1.76 mm, EL = 2.87 mm, EW = 1.70 mm, a1 = 0.24 mm, a2 = 0.12 mm, a3 = 0.16 mm, LL = 3 mm, TT = 1.9 mm.

Description. Head flat, vertex glabrous (Fig. 3A); eye with 1 supraorbital seta at each side of vertex (Fig. 3B: arrow g); genae glabrous; antennae long, antennomere 1 cylindrical (flattened by amber) and glabrous except for 1 long seta (Fig. 3A: arrow d), antennomere 2 cylindric, antennomere 3 glabrous except for several long setae, antennomeres 4–11 densely pubescent; mandibles triangular, hooked at apex, mandibles scrobe without seta; labrum slightly straight at apex, with 6 setae (Fig. 3A, B: arrow a); clypeus with 2 setae (Fig. 3A, B: arrow b); maxillary and labial palpi cylindrical, glabrous, slightly compressed at apex; mentum with one pair of setae near the base.

Pronotum trapezoid (Fig. 4A, B), widest at base; fore angles acute; lateral margins unbordered, without seta; disk glabrous; basal foveae very flat, nearly invisible; hind angles acute, without seta. Scutellum triangular, glabrous.

Elytra moderately convex, oblong, with 9 intervals; intervals 1–7 moderately convex, glabrous, interval 8 very narrow, almost invisible; scutellar striae invisible (Fig. 4A, B) stria 8 very deep, extended to sutural angle (Fig. 3E, F); shoulder angles with 1 long lateral side seta each side; lateral side with setae; epipleuron interrupted by elytral plica near apex (Fig. 3D).

Ventral surface glabrous (Prosternum, mesoventrite, proepisterna, mesepisterna, and metepisterna glabrous; metaventrite