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A NEW WEEVIL TRIBE, MEKORHAMPHINI TRIB. NOV. (COLEOPTERA, ITHYCERIDAE) WITH TWO NEW GENERA IN BURMESE AMBER

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A new tribe, Mekorhamphini trib. n., two new genera *Mekorhamphus* gen. n. and *Habropezus* gen. n. and two new species (*M. gyralommus* sp. n. and *H. plaisiommus* sp. n.) are described from Burmese amber. The new tribe resembles the tribe Mesophyletini but differs from the latter by possessing contiguous procoxal cavities and very wide elytra with regular striae. From the tribe Anchineini, it differs by the contiguous procoxal cavities, precoxal portion of the prosternum elongated, and swollen trochanters. The new taxa can be distinguished from modern Carini by having antennae attached near the middle of the rostrum, an elongated precoxal portion of the prosternum and enlarged trochanters.
Key words: Curculionoidea, Carinae, Mekorhamphini trib. n., Mekorhamphus gyralommus gen. et sp. n., Habropezus plaisiommus gen. et sp. n., Early Cretaceous, Cenomanian.

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INTRODUCTION

Weevils were widespread in Mesozoic ecosystems (Legalov, 2012, 2015). While they are rarely encountered in large numbers (as Karatau), they are sometimes common (as in Baissa and Bon-Tsagaan), but more often represented by only a few (as in other deposits) species and specimens (Gratshev, Legalov, 2011, 2014; Legalov, 2010, 2011, 2012, 2013, 2015; Davis et al., 2013). Weevils are rare in most Cretaceous deposits. Two species, *Libanorhinus succinus* Kuschel et Poinar, 1993 (Nemonychidae: Paleocartinae) and *Cylindrobrotus pectinatus* Kirejtshuk et al., 2009 (Scolytidae: Cylindrobrotinae) were described from Lower Cretaceous Middle Neocomian–Lower Aptian Lebanese amber. Also, *Antiquis opaque* Peris et al., 2014 (Ithyceridae: Carinae) and *Gratshevibelus erici* Soriano, 2009 (Belidae: Montsecbelinae) were described from Lower Cretaceous Albian French amber, *Arra legalovi* Peris et al., 2014 (Nemonychidae: Paleocartinae) and *Albicar contriti* Peris et al., 2014 (Ithyceridae: Baissorhynchinae) were described from Albian Spanish amber and two species, *Cretocar luzzii* Gratshev et Zherikhin, 2000 (Ithyceridae: Chilecarinae) and *Sanyrevilleus grimaldii* Gratshev et Zherikhin, 2000 (Rhynchitidae: Sayrevilleinae) were described from Upper Cretaceous, Turonian New Jersey amber. However the richest Cretaceous weevil fauna - five species:

(*Burminyx zigrasi* Davis et Engel, 2014 (Nemonychidae: Rhinorhynchinae), *Anchineus dolichobothris* Poinar et Brown, 2009, *Mesophyletis calhouni* Poinar, 2006 (Ithyceridae: Carinae), *Microborus inertus* Cognato et Grimaldi, 2009 (Scolytidae: Hexacolinae), and *Paleocryptorhynchus burmanus* Poinar, 2009 (Curculionidae: Erirhininae)) occur in mid-Cretaceous Cenomanian Burmese amber (Cognato & Grimaldi, 2009; Davis & Engel, 2014; Gratshev & Zherikhin, 2000; Kirejtshuk et al., 2009; Kuschel & Poinar, 1993; Legalov, 2015; Legalov & Poinar, 2015; Peris et al., 2014; Poinar, 2006, 2009; Poinar & Brown, 2009; Soriano, 2009).

Here we describe two new genera and species in the new tribe Mekorhamphini, in the family Ithyceridae.

MATERIAL AND METHODS

The specimens were obtained from mines in the Hukawng Valley, southwest of Maingkhwan in the state of Kachin in Burma (Myanmar). A probably Cenomanian radiometric age of Burmese amber has been proposed; however, the amber tested was from sedimentary beds, indicating that it had been re-deposited (Shi et al., 2012). Thus the age is likely somewhat older. Nuclear magnetic resonance spectra and the presence of araucaroid wood fibres in amber samples from the Noije Bum 2001 Summit site indicate an araucarian (possibly *Agathis*) tree source for the amber (Poinar et al., 2007).

The holotype of *Mekorhamphus gyralommus* gen. et sp. n. is deposited in the Institute of Systematics and Ecology of Animals (Russia: Novosibirsk) - ISEA and the holotype and paratype of *Habropezus plaisiommus* gen. et sp. n. are deposited in the Poinar amber collection maintained at Oregon State University (Corvallis, OR, USA) - PACO. Observations and photographs were made with a Leica-M165C binocular microscope and a Nikon SMZ-10 R stereoscopic microscope.

SYSTEMATIC PALEONTOLOGY

Ithyceridae Schoenherr 1823

Carinae Thompson, 1992

Mekorhamphini Poinar, Brown, Legalov, trib. n.

Type genus. *Mekorhamphus* Poinar, Brown, Legalov, gen. n.

Diagnosis. Mandibles moving horizontally with teeth on external margin. Maxillary palpi compact, 3-articled. Antennae inserted before middle of rostrum. Precoxal portion of prosternum elongated. Procoxal cavities contiguous. Elytral striae distinct. Ventrites free. Trochanters swollen, separating femora from coxae. First tarsomere weakly extended and narrow.

Comparison. The new tribe is similar to the tribe Mesophyletini but differs by having the procoxal cavities contiguous and wide and elytra with regular striae. From the tribe Anchineini, it differs by the contiguous procoxal cavities, elongated precoxal portion of the prosternum, and swollen trochanters. It is distinguished from the modern tribe Carini by having the antennae attached near the middle of the rostrum, the elongated precoxal portion of the prosternum, and the swollen trochanters.

Remarks. The new tribe belongs to the family Ithyceridae based on having all ventrites free, the maxillary palpi 3-articled, the elytra without scutellar striole and the 1st tarsomere weakly extended in *Mekorhamphus gyralommus*. The pronotum lacking a lateral carina and the mandibles with teeth on the external margin, moving horizontally, suggest placement of this tribe in the subfamily Carinae.

***Mekorhamphus* Poinar, Brown, Legalov, gen. n.**

Type species. *Mekorhamphus gyralommus* Poinar, Brown, Legalov, sp. n.

Etymology. Generic name from the Greek "mekos" = prolonged, and the Greek "rhamphos" = curving beak, in references to the long rostrum.

Diagnosis. Head not narrowed behind eye. Rostrum much longer than head and pronotum combined. Forehead narrow. Scape protruding behind middle of eye. Pronotum with dentiform convexity on sides in apical quarter. Metaventrite short. First, 2nd and 5th ventrites quite long. 3rd and 4th ventrites very short. Femora without teeth. Protibiae slightly curved with small mucro, with dense semi-erect hairs on the inner edge. Meso- and metatibiae serrulate on outer edge. First tarsomere conical, weakly extended. Second tarsomere almost bilobed. Tarsal claws free, strongly divergent, with teeth.

***Mekorhamphus gyralommus* Poinar, Brown, Legalov, sp. n.**

Figs. 1-2.

Etymology. The specific epithetet is from the Greek "gyros" = round and the Greek "omma" = eye in references to the strongly convex eyes.

Figure 1. *Mekorhamphus gyralommus* Poinar, Brown, Legalov, sp. n., ISEA No. MA2015/1: a – dorsal view; Scale bar = 0.7 mm b – anterior view. Scale bar = 0.5 mm.

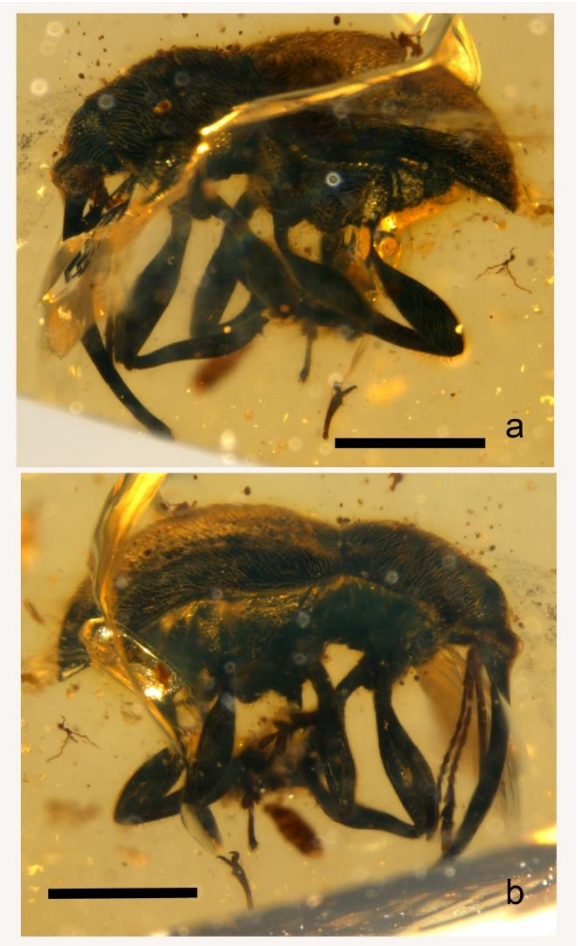

Figure 2. *Mekorhamphus gyralommus* Poinar, Brown, Legalov, sp. n., ISEA No. MA2015/1: a –l left lateral view; Scale bar = 1.0 mm b – right lateral view. Scale bar = 1.0 mm.

Description. Female. Body length (without rostrum) 3.1 mm. Rostrum length 1.7 mm. Body black with fairly thick semi-erect hairs that are directed apically on head and pronotum. Head not narrowed behind eye. Labrum fused. Horizontally moving mandibles with teeth on external margin. Rostrum long, strongly curved, much longer than head and pronotum together, approximately 18 times longer than wide. Eyes strongly convex, 1.3 times longer than wide. Forehead flat and narrow, slightly wider than rostrum at base. Temples short, 0.3 times as long as length of eye, punctate. Vertex convex and punctate. Gular suture single. Maxillary palpi compact, 3-articled. Antennal scrobes directed toward eye. Antennae long, protruding beyond humeri, inserted before middle of rostrum. Scape protruding behind middle of eye, 32.5 times longer than wide. Funicle with 2nd to 8th antennomeres conical, 0.7 times as long as scape. Second antennomere 3.7 times longer than wide, 0.2 times as long as and 1.5 times as wide as 1st antennomere. Third antennomere 4.5 times longer than wide, 0.8 times as long as and 0.7 times as narrow as 2nd antennomere. Third to 5th antennomeres subequal in width. Fourth antennomere 4.0 times longer than wide, 0.9 times as long as 3rd antennomere. Fifth antennomere 3.5 times longer than wide, 0.9 times as long as 4th antennomere. Sixth antennomere subequal to 5th antennomere. Seventh antennomere 2.0 times longer than wide, 0.7 times as long as 6th antennomere. Eighth antennomere 1.6 times longer than wide, 0.8 times as long as and equal in width to 7th antennomere. Club not compact, 0.7 times as long as funicle. First antennomere of club 2.5 times longer than wide, 2.5 times as long as and 1.6 times as wide as 8th antennomere. Second antennomere of club 1.8 times longer than wide, 0.7 times as long as and equal in wide to 1st antennomere of club. Third antennomere of club 3.7 times longer than wide, 1.9 times as long as and 0.9 times as narrow as 2nd antennomere of club. Pronotum bell-shaped, 1.9 times longer than wide at apex, 1.0 times longer than wide in middle and at base, with dentiform convexity on sides in apical quarter, without lateral carina. Sides almost straight, somewhat extended toward top. Disk strongly convex, densely and finely punctate. Scutellum almost square. Elytra 1.4 times longer than wide at base, 1.3 times longer than wide in middle, 1.6 times longer than wide at apical fourth, 1.9 times as long as pronotum, with slightly flattened humeri. Elytral striae distinct with quite large points. Elytral intervals flattened, quite wide, 2.0–3.0 times as wide as striae. Scutellar striole absent. Epipleura distinct. Apex of elytra rounded when together. Precoxal portion of prosternum elongated, 0.5 times as long as procoxal cavities, 2.3 times as long as postcoxal portion; postcoxal portion 0.1 times as long as procoxal cavities. Procoxal cavities contiguous. Metaepisternum with few large punctures, 5.4 times longer than wide in middle. Mesocoxal cavities narrowly separated. Metaventrite convex, short, coarsely punctate, almost equal in length to that of metacoxa. Abdomen convex. Ventrites free. First and 2nd ventrites slightly convex, 3rd - 5th ventrites flattened. First ventrite 0.6 times as long as length of metacoxal cavity. Second ventrite equal in length to 1st ventrite. Third ventrite 0.5 times as long as length of 2nd ventrite. Fourth ventrite 0.8 times as long as length of 3rd ventrite. Fifth ventrite 1.6 times as long as length of 4th ventrite. Procoxae large, conical. Metacoxae transverse. Trochanters swollen, separating femora from coxae. Femora thickened, lacking teeth. Profemora 3.4 times longer than wide. Mesofemora 3.5 times longer than wide. Metafemora 2.9 times longer than wide. Protibiae slightly curved with small mucro, with dense semierect hairs on the inner edge. Meso- and metatibiae weakly flattened, serrulate on outer edge, without uncus and mucro, with two apical spurs. Protibiae 8.8 times longer than wide in middle. Mesotibiae 9.1 times longer than wide in middle. Metatibiae 9.1 times longer than wide in middle. Tarsi weakly extended. First tarsomere conical, weakly extended. Second tarsomere almost bilobed and 3rd tarsomere bilobed. Fifth tarsomere elongated. Claws free, strongly divergent, with teeth. Protarsi: 1st tarsomere 1.6 times longer than wide at base, 2nd tarsomere 0.9 longer than wide at base, 0.6 times as long as and 1.1 times as wide as 1st tarsomere. Third tarsomere 1.4 times longer than wide, 1.6 times as long as and equal in length to 2nd tarsomere. Fifth tarsomere 3.0 times longer than wide at base, 1.1 times as long as and 0.5 times as wide as 2nd tarsomere. Mesotarsi: 1st tarsomere 1.2 times longer than wide at base. 2nd tarsomere 0.8 times longer than wide at base, equal in length and 1.5 times as wide as 1st tarsomere.

Material examined. Holotype, adult female, ISEA no. MA2015/1; Burmese amber; mid-Cretaceous.

***Habropezus* Poinar, Brown, Legalov, gen. n.**

Type species. *Habropezus plaisiommus* Poinar, Brown, Legalov, sp. n.

Etymology. Generic name from the Greek "habros" = delicate and the Greek "peza" = foot in reference to the narrow tarsi.

Diagnosis. Head narrowed behind eye. Rostrum barely longer than head and pronotum combined. Forehead quite narrow. Scape quite short, not quite reaching eye. Pronotum without dentiform convexity on sides in apical quarter, with sides weakly convex, narrowed to apex and base. Metaventrite long. 1st-3rd ventrites almost equal in length. Third ventrite longer than 4th ventrite. Femora without teeth. Tibiae almost straight, with two apical spurs, without dense semierect hairs on the inner edge of uncus and mucro. Tarsi quite narrow. First tarsomere not extended. Second tarsomere almost conical. Tarsal claws free, strongly divergent, with teeth.

***Habropezus plaisiommus* Poinar, Brown, Legalov, sp. n.**

Figs. 3-4a.

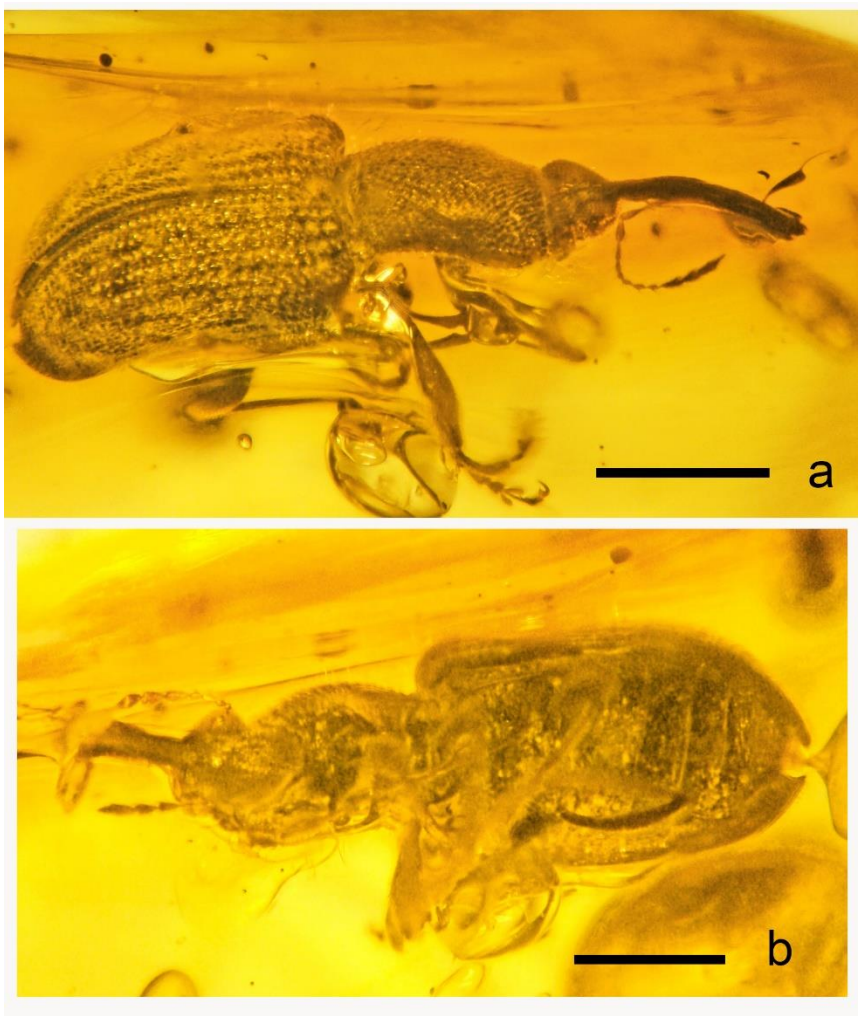

Figure 3. *Habropezus plaisiommus* Poinar, Brown, Legalov, sp. n. PACO No. Bu-C-48A: a – dorso-lateral view; Scale bar = 0.8 mm. b – ventral view. Scale bar = 0.7 mm.

Etymology. Specific epithetet from the Greek "plaision" = oblong, and the Greek " omma" = eye, in reference to the oval eyes.

Description. Female. Body length (without rostrum) 3.0 mm. Rostrum length 1.25 mm. Body brown with thick semi-erect hairs. Antennae and legs reddish-brown. Hairs directed upwards on head and pronotum. Head narrowed behind eye. Labrum fused. Mandibles probably with teeth on external margins that move horizontally. Rostrum long, weakly curved, barely longer than head and pronotum combined, 11.0 times longer than wide. Eyes strongly convex, oval, 1.9 times longer than wide. Forehead flat and quite narrow, 1.3 times as wide as width of rostrum at base. Temples short, 0.4 times as long as length of eye, punctate. Vertex flattened and punctate. Gular suture single. Antennal scrobes directed toward eyes. Antennae quite long, reaching basal part of pronotum, inserted before middle of rostrum. Scape almost reaching front line of eye, 16.5 times longer than wide. Funicle with 2nd to 8th antennomeres almost conical, 1.2 times as long as scape. Second antennomere 3.3 times longer than wide, 0.3 times as long as and 1.5 times as wide as 1st antennomere. Third antennomere 3.5 times longer than wide, 0.7 times as long as and 0.7 times as narrow as 2nd antennomere. Fourth to 6th antennomeres subequal in width. Fourth antennomere 3.3 times longer than wide, 0.7 times as long as and 0.8 times as wide as 3rd antennomere. Fifth antennomere 3.0 times longer than wide, 0.9 times as long as 4th antennomere. Sixth antennomere 2.7 times longer than wide, 0.9 times as long as 5th antennomere. Sixth to 8th antennomeres subequal in length. Seventh antennomere 2.0 times longer than wide. Eighth antennomere 1.8 times longer than wide. Club not compact, 0.8 times as long as funicle. First antennomere of club 2.0 times longer than wide, 2.0 times as long as and 1.8 times as wide as 8th antennomere. Second antennomere of club 2.3 times longer than wide, 1.1 times as long as and equal in width to 1st antennomere of club. Third antennomere of club 5.0 times longer than wide, 1.7 times as long as and 0.8 times as narrow as 2nd antennomere of club. Pronotum bell-shaped, 1.6 times longer than wide at apex, 1.3 times longer than wide in middle and 1.5 times longer than wide at base, without lateral carina or dentiform convexity on sides in apical quarter. Sides weakly convex, narrowed toward apex and base. Disk convex, densely and finely punctate. Scutellum almost square. Elytra 1.7 times longer than wide at base, 1.6

times longer than wide in middle, 2.1 times longer than wide at apical fourth, 2.1 times as long as pronotum, with distinct humeri. Elytral striae distinct, with quite large points. Elytral intervals flattened, wide, 3.3-6.0 times as wide as striae. Scutellar striole absent. Epipleura distinct. Apex of elytra rounded with both elytra together. Precoxal portion of prosternum elongated, almost equal in length to procoxal cavities, postcoxal portion short. Procoxal cavities contiguous. Metaepisternum punctate, 5.9 times longer than wide in middle. Mesocoxal cavities separated. Metaventrite weakly convex, long, coarsely punctate, 2.2 times as long as length of metacoxa. Abdomen convex. Ventrites free. First ventrite 1.5 times as long as length of metacoxal cavity. Second ventrite equal in length to 1st ventrite. Third ventrite 0.9 times as long as length of 2nd ventrite. Fourth ventrite 0.6 times as long as length of 3rd ventrite. Fifth ventrite 1.3 times as long as length of 4th ventrite. Procoxae large, conical. Metacoxae transverse. Trochanters slightly swollen, separating femora from coxae. Femora clearly thickened but without teeth. Profemora 4.1 times longer than wide. Metafemora 3.6 times longer than wide. Tibiae almost straight, with two apical spurs, without uncus, mucro or dense semi-erect hairs on the inner edge. Protibiae 14.0 times longer than wide in middle. Metatibiae 9.4 times longer than wide in middle. Tarsi quite narrow. First tarsomere conical, long, not extended. Second tarsomere almost conical. Third tarsomere bilobed. Fifth tarsomere elongated. Claws free, strongly divergent, with teeth. Protarsi: 2nd tarsomere 0.5 times as long as 1st tarsomere; 3rd tarsomere 1.2 times as long as 2nd tarsomere; 5th tarsomere 1.7 times as long as 2nd tarsomere. Metatarsi: 2nd tarsomere 0.5 times as long as 1st tarsomere; 3rd tarsomere subequal in length to 2nd tarsomere; 5th tarsomere 2.5 times as long as 2nd tarsomere.

Material examined. Holotype, adult female, PACO no. Bu-C-48A; Burmese amber; mid-Cretaceous. Paratype, PACO no. Bu-C-48B., Burmese amber; mid- Cretaceous.

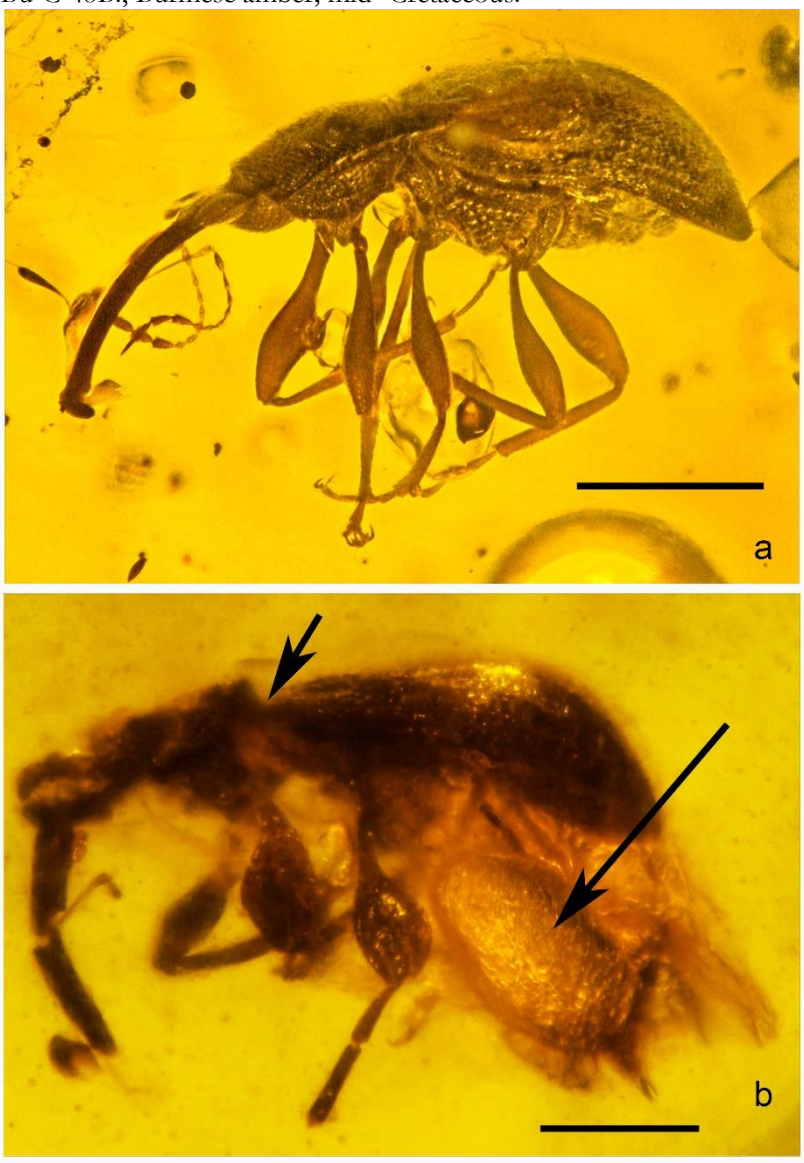

Figure 4. *Habropezus plaisiommus* Poinar, Brown, Legalov, sp. n. a – lateral view, holotype, PACO No. Bu-C-48A; Scale bar = 1.0. b – Paratype with wasp cocoon, (right arrow); left arrow shows gap between thorax and abdomen where wasp larva probably emerged. paratype, PACO No. Bu-C-48B. Scale bar = 0.8 mm.

DISCUSSION

Weevil fauna in Burmese amber has common features with other Cretaceous faunas, but it also differs significantly from other Upper Cretaceous weevils. Representative of advanced Nemonychidae without lateral carina on the sides of the pronotum were described previously in Burmese amber (Davis & Engel, 2014). These beetle lineages occur in the Early Cretaceous as primitive subfamilies (Gratshev, Legalov, 2014). Nemonychidae are absent in most other Late Cretaceous faunas, with only *Turononemonyx* Legalov, 2014 subfamily of Cretonemonychinae found in the Turonian of Kzyl-Dzhar (Legalov, 2014b).

The largest number of weevils in Burmese amber belong to the family Ithyceridae of the subfamily Carinae (Legalov, 2015), but most of them remain undescribed (Xia et al., 2015). The subfamilies Baissorhynchinae and Mongolocarinae dominated in the Early Cretaceous (Legalov, 2012).

The Burmese scolytid belongs to the modern genus *Microborus* Blandford, 1897, which is widespread in tropical America and Africa (Alonso-Zarazag & Lyal, 2009). This discovery shows the antiquity of this family, which appeared in the fossil record somewhat earlier (Legalov, 2015) than the most primitive weevil tribe Palaeoerirhinini, which could be an intermediate group connecting the Ithyceridae to the family Curculionidae (Legalov, 2014a).

The Curculionidae is presented in Burmese amber by representatives of the primitive subfamily Erirhininae, however *Paleocryptorhynchus burmanus* belongs to a fairly advanced tribe characterized by the prosternum with a ventral channel and resembles the tribes Arthrostenini, Tadiini and Aonychusini (Legalov & Poinar, 2015).

The paratype of *Habropezus plaisiommus* is especially interesting since it was parasitized and has a wasp cocoon adjacent to it (Fig. 4b). Parasitic wasps of the families Ichneumonidae and Braconidae are known to attack weevils, but only members of the Braconidae sting and emerge from adult weevils. These adult-attacking braconids include representatives of the genera *Syrrhizus*, *Microctonus* and *Perilitus* in the subfamily Euphorinae (Clausen, 1962; Goulet & Huber, 1993).

Members of the genus *Perilitus* leave their host alive, while *Syrrhizus* and *Microctonus* kill their host prior to emergence. With the present fossil, it is obvious that the host was killed since it shows signs of decomposition. Female *Syrrhizus* wasps oviposit into the weevil's abdomen, under the elytra (Zijp & Blommers, 1992) and may leave the body of the weevil between the thorax and abdomen, as in the parasitized fossil weevil (Fig. 4b). The emerging pre-pupae of *Syrrhizus* species spin white cocoons. *Microctonus* species also emerge as pre-pupae from their adult weevil hosts and spin yellowish-white cocoons (Loan & Holdaway, 1961). The wasp was determined to be a braconid of the subfamily Euphorinae (Poinar & Shaw, 2016). This represents the first fossil evidence of weevil parasitism by Hymenoptera.

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