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Two New Species of Aculeate Hymenopterans (Vespida = Hymenoptera) from the Middle Eocene of the United States

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Abstract—*Propalosoma gutierrezae* gen. et sp. nov. (Rhopalosomatidae) and *Camponotites kraussei* sp. nov. (Formicidae) are described from the Middle Eocene Klondike Mountain Formation of Republic, Washington, USA, based on material housed in the Burke Museum of Natural History and Culture, Washington University, Seattle, Washington, USA.

INTRODUCTION

Wehr and Barksdale (1996) listed insects of 16 orders from the Middle Eocene deposits of the Klondike Mountain Formation, Washington, USA including five families of hymenopterans (Braconidae, Ichneumonidae, Sphecidae, Megachilidae, Formicidae). Two more families can be added to the list: a representative of Cimbicidae is figured as Hymenoptera *incertae sedis* by Lewis (1992), and a member of the Rhopalosomatidae described below. Numerical data are given by Lewis (1992): of 535 total insect specimens 373 are determined to order, and 25 of these are hymenopterans (6.7%). Such a proportion is usual for non-volcanogenic deposits of the Paleogene (Rasnitsyn, 1980). Of 25 ichnofossils (hymenopteran traces) five specimens are leaves with characteristic leaf-cutting damage by megachilid bees, and, according to the data of Lewis, of the remaining twenty ten are ants. This is an unusually high proportion for the Paleogene (compare Dlussky and Fedoseeva, 1988). However, the diversity of Early and Middle Eocene ants has generally been underestimated up to now. According to our data, ants constitute 17% of the collection of Lower Eocene hymenopterans from the Green River Formation, Colorado, housed in the National Museum of Natural History, Washington, USA.

We were able to study two interesting fossil hymenopterans from the Klondike Mountain Formation. One of them represents a new genus of the small but widely distributed family Rhopalosomatidae, previously known in the fossil record only from the Lower Cretaceous of Brazil (Darling and Sharkey, 1990). Another specimen is most probably a female of a carpenter ant *Camponotus* (the genus is known beyond doubt from the Late Eocene), but due to insufficient preservation of some characters it should be assigned to a formal genus. The described material is housed in the Burke Museum of Natural History and Culture, Seattle, Washington, USA (UWBM), partly belonging to the Stonerose Interpretive Center, Republic, Washington, USA (SR).

SYSTEMATIC PALEONTOLOGY

Family Rhopalosomatidae Ashmead, 1896

Genus *Propalosoma* Dlussky et Rasnitsyn, gen. nov.

Etymology. From *Rhopalosoma*.

Type species. *P. gutierrezae* sp. nov.

Diagnosis. Scape short. Wings normally developed. Forewing with costal area narrow but distinct, widened before pterostigma; pterostigma broad and short, triangular; *2r-rs* very short; central cells short (*1mcu* and *2rm* combined occupying about 1/4 wing length); *cu-a* antefurcal (before separation of M and Cu). Metasoma long and narrow, probably with long and narrow waist (judging from the shape of preserved second segment).

Composition. Type species.

Comparison. Distinct from the other genera with normally developed wings (modern American *Rhopalosoma* Cresson, 1865, Ethiopian and Oriental *Paniscomima* Enderlein, 1904, Neotropical and Oriental *Liosphex* Townes, 1977, and Early Cretaceous Brazilian *Mesorhopalosoma* Darling, 1990) (Townes, 1977; Darling and Sharkey, 1990) in the not completely reduced costal area, large triangular pterostigma, short central cells, and antefurcal *cu-a*. Besides that, distinct from *Mesorhopalosoma* in the absence of *3r-m* and *2m-cu* and (as well as from *Liosphex*) in the slender metasoma.

Remarks. Identification of the fossil as belonging to the family Rhopalosomatidae is based on the characteristic shape of the central cells combined with the narrow costal area, cell *3r* closed at the wing margin, and short scape of the antenna. Ants of the subfamily Formiciinae possess a superficially similar venation, but are distinct in the broad costal area, cell *3r* closed at

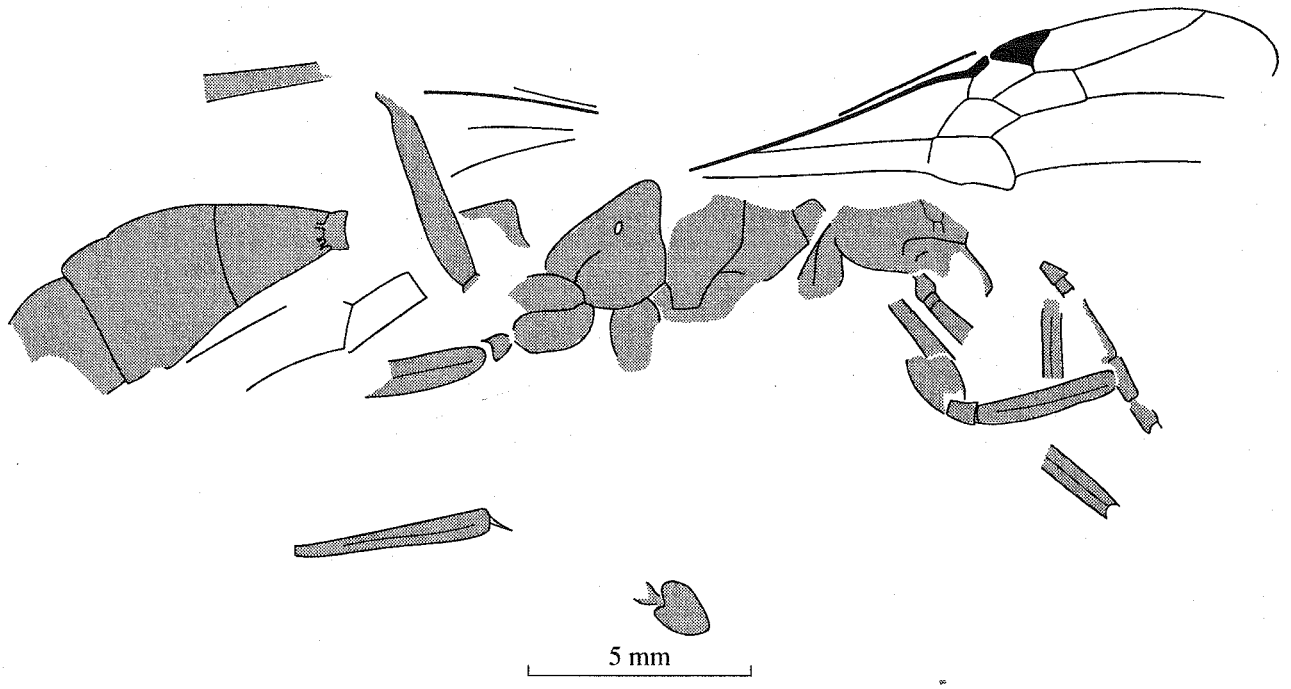

Fig. 1. *Propalosoma gutierrezae* gen. et sp. nov., holotype SR, 93-8-4.

a distance from the wing margin, and the very long scape of the antenna. The new genus differs from the other rhopalosomatids in primitive characters (costal area, short central cells), but in some other characters (no *3r-m* and *2m-cu*, antefurcal *cu-a*) it is more derived than the Cretaceous genus or even than *Liosphex* (i.e., in the very slender body). It is the first fossil rhopalosomatid known from the Cenozoic, or from North America or the Northern Hemisphere as a whole.

***Propalosoma gutierrezae* Dlussky et Rasnitsyn, sp. nov.**

Etymology. After Ms Karen Gutierrez.

Holotype. SR, 93-8-4, incomplete and somewhat disarticulated, moderately well preserved specimen; Boot Hill locality (site UWBM B4131), nr. Republic, Washington, USA (coll. K. Gutierrez, 1991); Middle Eocene, Klondike Mountain Formation.

Description (Fig. 1). The head is seemingly large, with the mandibles larger than in *Rhopalosoma*. The scape is weakly elongated, slightly wider than the pedicel; the latter is weakly transverse or weakly elongate (looking different in the right and left antennae); first flagellomere is more than three times, the second one more than twice, and the third one almost twice, as long as wide. The propodeum is relatively short and high, with a large oval spiracle. The legs are long and slender (the femora 6 times or more as long as wide, the tibiae even more elongated); the femora and tibiae bear longitudinal thickening. The trochanter is short; a vestige of the second trochanter is present at least in the fore legs. The tibial spurs are possibly shorter than in *Rhopalosoma*. The second metasomal segment is somewhat longer and much narrower than the third, truncate conical, with a powerful articulatory head basally, giving off short backward directed carinae.

Measurements, mm: body length as preserved, 22; length of hind (?) tibia, 4.5; forewing length, 13.8.

Remarks. The sex of this specimen is not known beyond doubt; judging from the scarcely thickened base of the femora, it is a male, assuming the swollen bases of the femora characteristic of modern rhopalosomatid females were already acquired by this genus. The thoracic structure is poorly known. The longitudinal thickening on the femora and tibiae could in fact be a mere preservation fold. The tarsal structure is unknown. The body length in life could be greater or smaller than preserved in the impression.

Material. Holotype.

Family Formicidae Latreille, 1802

Genus *Camponotites* Dlussky, 1981

***Camponotites kraussei* Dlussky et Rasnitsyn, sp. nov.**

Etymology. After Mr Ronald Krausse.

Holotype. UWBM, 78047, well preserved winged female; Golden Promise Mine (site UWBM B4876), nr. Republic, Washington, USA (coll. R. Krausse, 1994); Middle Eocene, Klondike Mountain Formation.

Description (Fig. 2). Winged female. The head is rectangular with nearly straight sides, markedly rounded occipital angles and a weakly convex occipital margin. The head (excluding mandibles) is 1.25 times

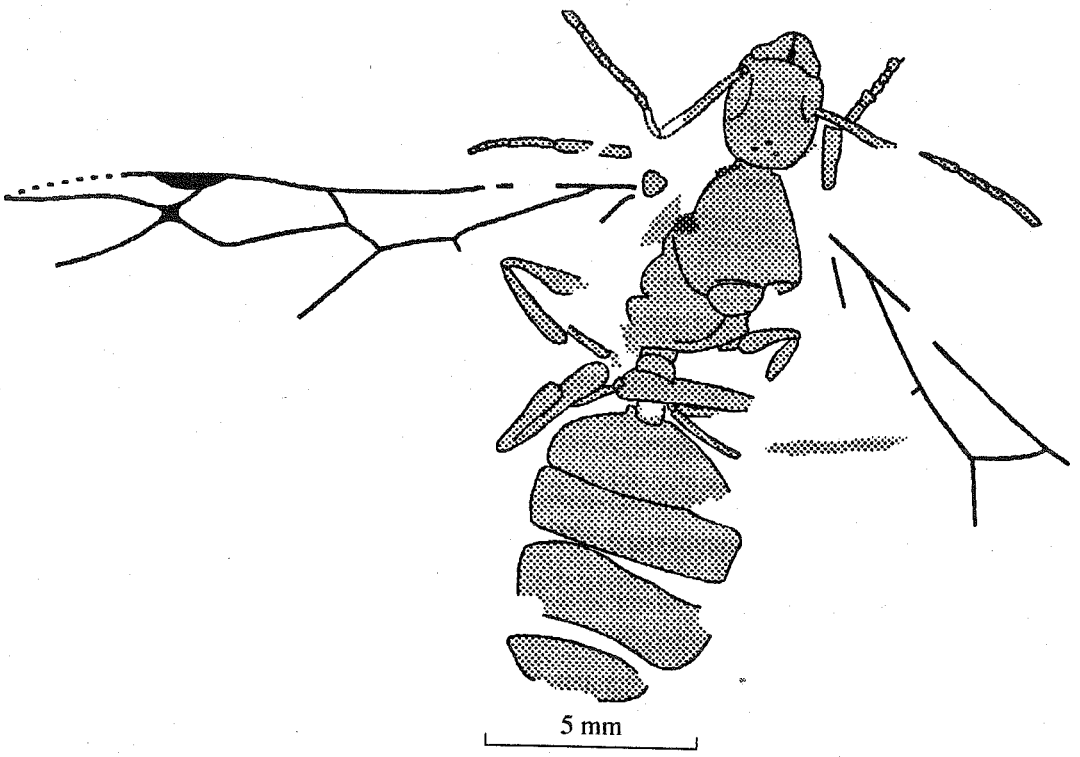

Fig. 2. *Camponotites kraussei* sp. nov., holotype UWBM, 78047.

as long as wide. The anterior clypeal margin is weakly convex. The outline of the eyes is poorly visible. The eyes are large, flattened, displaced forwards. The ocelli form an obtuse triangle. The mandibles are powerful, triangular, with a concave outer margin and a few relatively large teeth. The antennae are geniculate, 12-segmented, without a club. The scape is as long as the head, so that in life the scape reached slightly beyond the occipital margin. The mesosoma lacks spines or teeth. The scutum is not swollen. The legs are of usual structure, neither elongate nor thickened. The forewing has cells 1r and 2r closed, and cells *rm* and *mcu*. The distal branches of RS and M originate from the same node, the distal RS branch being curved towards the anterior wing margin. The petiole is long (only 2.5 times as short as the metasoma), with a node or a narrow, thickened scale, 2.7 times as long as wide. The abdomen is large and (on account of the specimen preservation) soft. The surface is weakly shagreened.

Measurements, mm: body length, 16.7; mesosoma length, 4.8; head length excluding mandibles, 2.75; head width, 2.2; scape length, 2.75; petiole length, 1.9; petiole width, 0.7; forewing length (from the base to the apex of 2r cell), 14.8.

Comparison. The wing is very similar to that of *C. macropterus* Dlussky, 1981, being distinct in the smaller size and less curved distal RS.

Remarks. On account of the overall habitus, the new species most probably belongs to the genus *Camponotus* Mayr, 1861, one of the largest ant genera, whose representatives are common in the fossil record from the Late Eocene onwards. However, generic characters (insertion of the antennae, absence of the metapleural glands, etc.) are untraceable in this specimen, so we assigned it to the formal genus *Camponotites* uniting the fossil ants with the venation of *Camponotus*-type (Dlussky, 1981). Several characters (clypeal sutures, apex of the abdomen, chaetotaxy) are not visible in the impression.

The wings without *rm* and *mcu* cells and with a closed 2r cell occur in many members of the Formicinae, including all the members of the tribes Plagiolepidini, Camponotini and Oecophyllini. All Plagiolepidini have 11-segmented antennae. The new species is distinct from all described fossil *Camponotus* species in the long petiole, and from remaining Camponotini and *Oecophylla* F. Smith, 1860 in the absence of specialized characters (elongate appendages, spines on mesosoma, etc.).

Material. Holotype.

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