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Daniel J. Bennett

Stephen F Austin State University, bennettdj@sfasu.edu

Michael S. Engel

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***Pison menkei*, a new crabronid wasp in Dominican amber**

(Hymenoptera: Crabronidae)

With 5 figures

D. J. BENNETT and M. S. ENGEL

Summary

A new crabronid wasp species, *Pison menkei* sp. n., is described and figured from a single female preserved in Early Miocene (Burdigalian) Dominican amber. The fossil is herein distinguished from extant and extinct congeners and regarded as an isolated species removed from modern Neotropical species groups. It is the seventh named fossil *Pison* and the second from Dominican amber.

Zusammenfassung

Eine neue Crabronide, *Pison menkei* sp. n., wird anhand eines einzelnen Weibchens aus dem Dominikanischen Bernstein des frühen Miozän (Burdigalian) beschrieben. Das Fossil unterscheidet sich deutlich von rezenten und ausgestorbenen Vertretern der Gruppe und wird als isolierte Form betrachtet, die abseits von modernen neotropischen Artengruppen steht. Es handelt sich um die siebente benannte fossile *Pison*-Art, die zweite aus Dominikanischem Bernstein.

Keywords

Fossil, paleontology, taxonomy, Tertiary, Miocene, Apoidea.

Introduction

Of the few crabronid wasps known from amber, no genus is better represented than *Pison* JURINE (BENNETT & ENGEL, 2006), a large but poorly studied group of spider predators which, from the few records available, nest in a variety of situations. Included are ground and stem nesters, users of beetle burrows in wood, as well as modifiers of other wasp and even bird nests (MASUDA, 1939; ONIKI, 1970; TSUNEKI, 1970; BOHART & MENKE, 1976). Though the genus is widespread, native species are conspicuously absent from the Nearctic fauna. The only modern treatment of the genus at large, MENKE's (1988) revision of New World species, nearly tripled the number known from the Neotropics, brought the number of world species to about 200, and highlighted the large Australian fauna which today remains in need of review. Other treatments of narrower scope are given by TSUNEKI (1983) on species from the Philippines, NAUMANN (1990) on the Australian *caliginosum* species group, and ANTROPOV (1994) on the Oriental and eastern Palearctic *agile* species group. Eocene age Baltic and Parisian ambers, as well as Miocene age Dominican amber, have all produced species of *Pison* (COCKERELL, 1909; ANTROPOV & PULAWSKI, 1989, 1996; NEL, 2005), and two

compressions are known, one from Colorado's Eocene-Oligocene Florissant shale (ROHWER, 1908) and another from China's Miocene Shanwang formation in Shandong Province (ZHANG, 1985). Herein is described the seventh named fossil species of the genus and the second from Dominican amber. Morphological terminology follows BOHART & MENKE (1976) and MENKE (1988).

Systematic Paleontology

Pison menkei, sp. n. (Figs 1-5)

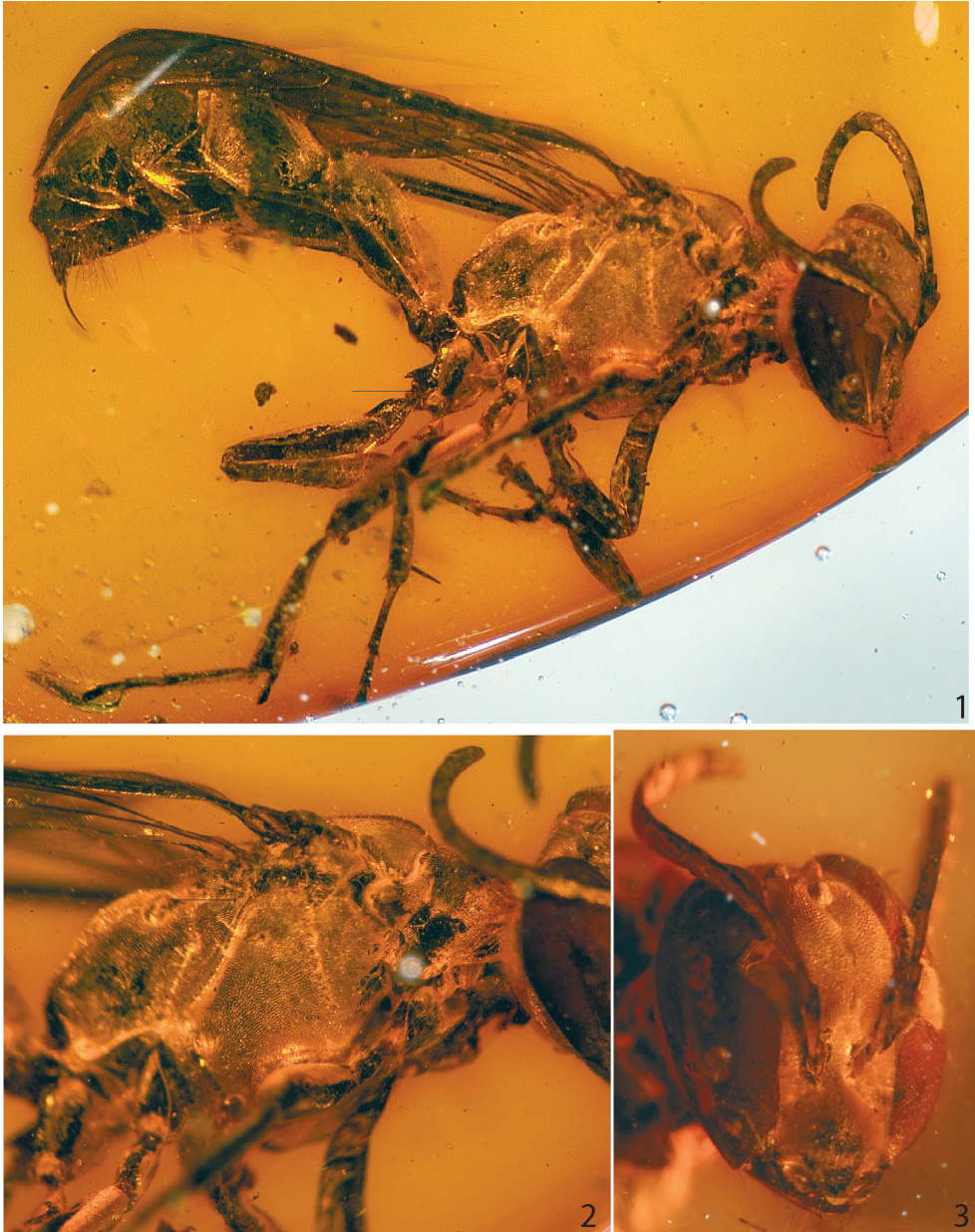
Diagnosis:

The new species differs from extant and extinct species of *Pison* by the following combination of traits: head longer than wide, epistomal sulcus medially pointed up (possibly unique), sulcus along condylar ridge of mandible, ventral mandibular margin concave, slightly emarginate labrum, inner flange extending over torulus, median sulcus on frons, strongly convex upper frons and clypeus, and first recurrent vein ending in submarginal cell I.

Description:

♀: Body length ~9.0 mm (excluding antenna), forewing length 6.5 mm. Black where color apparent (otherwise an artificial silver sheen), without maculations, forewings infumate except hyaline anterobasal area.

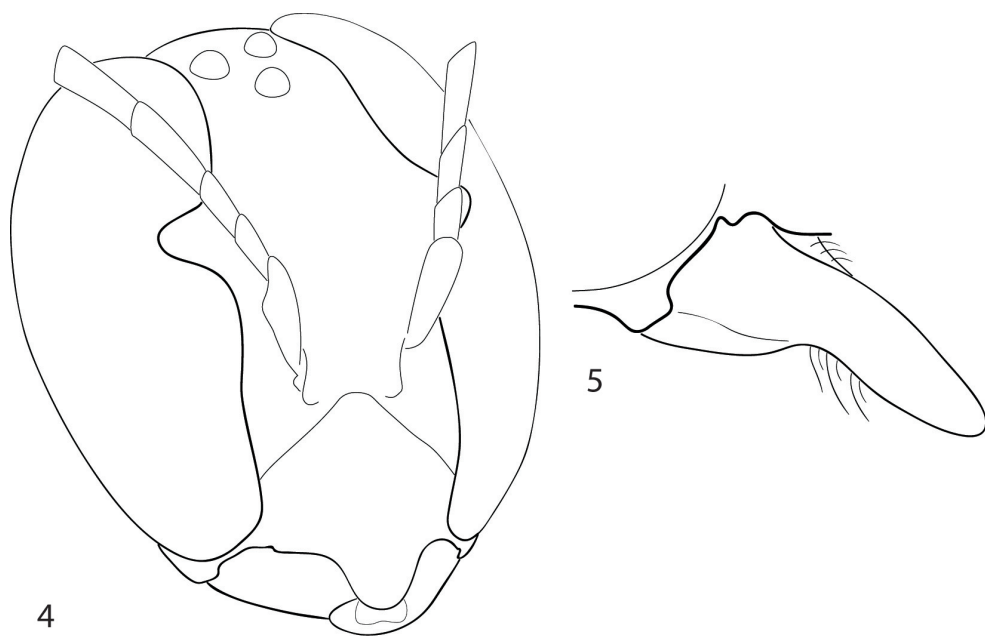
Head (Figs 3, 4) in frontal view rather narrow, width ~0.8x height (~1.6 mm wide; ~2.0 mm long [from vertex to clypeal apex]). Compound eye length 1.7 mm; dorsally bulging above level of vertex; facets similar in size above and below eye notch; inner margins vertical, not converging in lower 1/3, converging in upper 1/4; UID (0.67 mm) about 0.75x LID (~0.50 mm). Lateral ocellus separated from compound eye by about 1/4 lateral ocellar diameter, apparently separated from opposite ocellus by slightly less than mid-ocellar diameter, separated from mid ocellus by about mid-ocellar diameter. Vertex narrow. Upper frons strongly and broadly swollen, coarsely punctate medially, with strong, longitudinal, median sulcus below mid ocellus; lower frons with weak, tubercle-like frontal line, more or less flat between and immediately above toruli, evenly raised into swelling of upper frons. Torulus nearly contiguous with epistomal sulcus, separated from its counterpart by about mid-ocellar diameter, concealed by ventrally expanded inner flange. Scape 0.47 mm x 0.15 mm; pedicel 0.14 mm long; flagellum longitudinally flattened in proximal 2/3 (likely post-mortem deterioration), 10-segmented, segments similar in size, becoming only slightly shorter progressively, segment lengths 1.69-2.64x their widths (F1 0.32 mm x 0.14 mm, F2 0.37 mm x 0.14 mm, F3 and F4 each 0.32 mm x 0.16 mm, F5 0.27 mm x 0.16 mm, F6 0.24 mm long, F7 0.21 mm long, F8 0.19 mm long, F9 0.24 mm long [likely artificial magnification], F10 0.30 mm long [likely artificial magnification]), F10 with subapical, ventral, transverse line. Clypeus strongly swollen medially; free margin entire, medially arched into a blunt lobe, laterally concave. Epistomal sulcus between toruli bluntly directed dorsally. Malar space lacking, eye reaching mandibular articulation. Labrum weakly emarginate, 0.22 mm wide, exerted beneath median clypeal lobe (absent or not exposed laterally), edged by about 15 stout setae. Occipital carina ventrally strong, meeting or nearing hypostomal carina. Mandible (Fig. 5) with basal, outer face concave; ventral margin entire, concave subbasally (in place of step notch of some congeners), medially bearing about 4 long, apically directed setae; apex acute; with a sulcus (but not a ridge) along condylar ridge; inner face concealed. Labial palps at least 4-segmented. Last 2 segments (at least) of maxillary palp slender, apically swollen. Gena fairly narrow, maximum width about 0.40 mm, or about 1/2 eye width.



Figs 1-3: Holotype female of *Pison menkei* sp. n. in Dominican amber (MACT-1110). – 1 lateral habitus. – 2 close-up of mesopleuron. – 3 oblique aspect of head.

Mesosoma with pronotum in dorsal view extended anteriorly, triangular, sides evenly rounded, dorsomedial anterior area without modifications and apparently without transverse depression or pit (the possibility of a small anterior pit remains given the inadequacy of available views), posterodorsal margin constricted relative to mesoscutum; in side view lateral lobe rounded, separated from tegula by about half tegular length. Propleuron laterally lamellate. Mesoscutum

evenly convex, rising above pronotum (Fig. 2); with parapsidal lines and notauli evident; latter long, reaching hind scutal margin; laterally with narrow flange over inner margin of tegula. Scutellum fairly flat, with scutoscuteellar groove foveate. Mesopleuron (Fig. 2) ventrally strongly concave (likely collapsed); with episternal sulcus strong, foveate, reaching front margin of mesopleuron; postspiracular carina and scrobe present; mesopleural suture foveate; epicnemial carina absent (an apparent carina ventrolaterally on left side only is likely an artificial result of the ventrally collapsed mesopleuron); metapleuron with dorsal flange lamellate, but seemingly not as broad as lateral ocellus. Propodeum with anteromedian carina crossed by numerous oblique ridges that shorten posteriorly and together form a triangle; midline interrupted by a tubercle at upper margin of propodeal declivity, concave below tubercle; dorsolateral margin with foveate sulcus between spiracle and petiole socket, not accompanied by distinct carina (though edges of each fovea line up and give this impression on right side); with intercoxal carina strong. Fore wing with 1 apically acute marginal cell extending well past submarginal cell II; 3 submarginal cells; 2 discoidal cells;



Figs 4-5: Female of *Pison menkei* sp. n. in Dominican amber (MACT-1110). – 4 oblique aspect of head. – 5 mandible.

submarginal cell II about as high as its petiole; distance between recurrent vein I and submarginal cell II slightly greater than distance between the latter and recurrent vein II; discoidal cell long, 3.80x height; M diverging from Cu slightly distad cu-a; imaginary line from marginal cell apex to apical posterior corner of discoidal cell II apparently just crossing apex of submarginal cell II; first and second recurrent veins meeting submarginal cells I and III respectively. Protochanter widest apically, 0.43 mm long x 0.21 mm wide; protrochantellus narrow and ring-like; profemur widest medially, 0.94 mm long x 0.43 mm wide; protibia weakly spinose on anterior surface, widest medially, 0.89 mm long x 0.21 mm wide, without apical spur, with antennal cleaner 0.40 mm long, slightly sinuate; protarsus 5-segmented, with basitarsus slightly shorter than combined length of remaining segments, segments progressively shorter except apical segment which is about as long as combined length of tarsomeres III and IV, plantulae about equal in size, present on

tarsomeres II-IV, tarsomere lengths I-V = 0.48 mm, 0.19 mm, 0.14 mm, 0.12 mm, and 0.32 mm respectively; propretarsus with claw simple and arolia distinct. Mesocoxa with outer longitudinal carina strong (apparent lobe on one side is result of damage), inner carina weak or absent dorsally; mesotrochanter 0.48 mm long x 0.25 mm wide; mesofemur shaped as in profemur, 1.0 mm long x 0.40 mm wide; mesotibia rather sparsely spinose and somewhat flattened, with apex rounded, 0.98 mm long x 0.14 mm wide, with a single, long spur (0.60 mm); mesotarsus as in protarsus, tarsomere lengths I-V = 0.70 mm, 0.40 mm, 0.27 mm, 0.14 mm, and 0.33 mm respectively; mesopretarsus as in propretarsus (including plantulae). Metacoxa with outer carina weak, especially medially, inner carina strong, nearly lamellate dorsally; metatrochanter widest apically 0.48 mm long x 0.25 mm wide; metafemur widest subbasally, 1.60 mm long x 0.44 mm wide; metatibia sparsely spinose, with apex truncate, 1.35 mm long x 0.24 mm wide, with 2 tibial spurs (tips broken); metatarsus as in protarsus except apparently without plantulae, tarsomere lengths I-V = 0.77 mm, 0.46 mm, 0.32 mm, 0.17 mm, and 0.40 mm; metapretarsus as in propretarsus.

Metasoma sessile, moderately constricted between TII and TIII; TII not humped but with weak swelling subposteriorly; pygidial plate absent; S1 with medial carina anteriorly, bifurcating at anterior 1/3 and extending nearly to posterior sternal margin; sterna without oblique lateral grooves; sting slightly curved ventrally.

Vestiture. Compound eyes apparently naked; minute, declined setae covering most of body; becoming erect to semi-erect on vertex, gena, frons, and propodeum medially; becoming longer and appressed on lower face and clypeus laterally, and propodeum lateroventrally; SIII-V with a few long, erect setae in a subapical row; S6 with numerous such setae throughout.

Sculpture. Minutely punctured areas with punctures separated by at least their own diameter are the vertex, gena, mesoscutum, tegula in part (punctured on inner half, smooth on outer and possibly more coarsely so on inner margin), scutellum, metapleuron, much of propodeum (dorsally, laterally) and likely most of metasoma (much of its fine detail is obscured); more strongly punctured, with punctures separated by less than their own diameter, are frons, much of mesopleuron, and dorsolateral margin of pronotum.

Holotype:

Female, MACT-1110; Early Miocene (Burdigalian) amber, Dominican Republic; Morone Amber Collection, Turin, Italy.

Etymology:

The specific epithet is a tribute to Dr. Arnold S. MENKE for his significant contributions to the study of *Pison*.

Remarks:

The fossil is clearly recognizable as a species of *Pison* based on the combination of the emarginate compound eyes, entire posterior mandibular margin, apically acute marginal cell, three submarginal cells, submarginal cell two petiolate, apically acute marginal cell extending well past submarginal cell III, sessile metasoma, and lack of oblique sternal grooves. Though there are some similarities to the fossil *Pison antiquum* ANTROPOV & PULAWSKI, in most notably the bluntly arched lobe of the clypeal free margin medially (Fig. 4) and the first recurrent vein ending in submarginal cell I, it differs in more features including the lengths of the flagellomeres 1.69-2.64x their widths (see also description above; 2.70-3.20x their widths in *P. antiquum*), slightly emarginate labrum (not emarginate in *P. antiquum*), occipital carina ventrally joining or ending near hypostomal carina (occipital and hypostomal carinae widely separated in *P. antiquum*), face

width about 0.8x height (1.27x height in *P. antiquum*), propodeal sculpture (see description above and ANTROPOV & PULAWSKI [1996]), and height of submarginal cell II about as high as its petiole (less than height of petiole in *P. antiquum*). Furthermore, the narrow head and inner flange over the torulus are unique among the known extant and extinct New World species of *Pison*. The combination of the following further distinguishes it from all other known *Pison* species: epistomal sulcus medially pointed up (possibly unique); sulcus along condylar ridge of mandible; ventral mandibular margin concave; slightly emarginate labrum; median sulcus on frons; and the strongly convex upper frons and clypeus. Following MENKE (1988), the fossil does not readily key to any extant New World species or convincingly conform to any species group described therein. This, in combination with the putatively unique features of the fossil, warrants its treatment as an isolated species, removed from modern New World species groups. Whether such an interpretation will hold with regard to species from other regions must await much needed taxonomic revision of Old World *Pison* species. The usual problem of limited character data available from a single fossil specimen further impedes recognition of potential affinities to modern New World species groups. However, similarities to two New World groups are worth noting. The subbasal concavity of the mandible is reminiscent of a similarly placed notch or step in the *P. convexifrons* and *P. pilosum* species groups, and the swollen frons is like that of the former. Yet the fossil apparently lacks the polished, anterodorsal pronotal surface characteristic of these groups. Other than the mandible form and the fossil's autapomorphies, the characters viewable in the fossil are consistent with those of the *P. conforme* group of species. These include the swollen frons and clypeal disk, narrowly incomplete hypostomal carina (possibly), lack of an anterodorsal pronotal lamella, protuberant and rounded female clypeal lobe, episternal sulcus curving forward to anterior of mesopleuron, weak outer carina of metacoxa, fore wing M diverging from Cu distad cu-a, and fore wing marginal cell apically acute. Male characters and additional structures hidden in the fossil (e.g. labrum, hind face of pronotum) are needed to further evaluate the fossil's potential affinity to this group. Furthermore, all of the characters that diagnose the *P. conforme* group are admittedly plesiomorphic (MENKE, 1988), and thus a potential alliance to this group likely would not reveal its inclusion in a clade but would instead reinforce its exclusion from the better defined species groups.

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Authors' address:

Mr. D. J. BENNETT and Prof. Dr. M. S. ENGEL
Division of Entomology (Paleoentomology)
Natural History Museum
1501 Crestline Drive – Suite 140
University of Kansas
Lawrence, Kansas 66049-2811
United States

Subject editor:

Prof. Dr. H. H. DATHE