Paralienates hyalinus n. gen. and n. sp. (Enicocephalidae: Heteroptera): fossil gnat bug from Dominican amber (lower Oligocene - upper Eocene)[1,2]

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ABSTRACT

***Paralienates hyalinus*, from Dominican amber, is described.**

Key words: *Paralienates hyalinus* (Heteroptera: Enicocephalidae), Dominican amber

RESUMEN

***Paralienates hyalinus* n. gen. and n. sp. (Enicocephalidae: Heteroptera): enicocefálido fósil de ámbar dominicano (Oligoceno inferior - Eoceno superior)**

***Paralienates hyalinus* es descrito a partir de un ejemplar en ámbar dominicano.**

INTRODUCTION

The Enicocephalidae is mainly a pantropical family of relatively cryptic, small (usually 2-5 mm long) true bugs. The members of this family are characterized by a bilobed head resulting from a strong postocular constriction, usually trilobed thorax, and thick-veined membranous wings. The family includes six subfamilies, three in the New World (the Enicocephalinae, Aenictopecheinae, and the Alienati-

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[2]Acknowledgment. K. C. McGiffen (Illinois Natural History Survey) lent us the holotype of *Alienates millsi* Kritsky (1981). R. C. Froeschner and G. F. Hevel (National Museum of Natural History, Washington, D.C.) lent us paratypes of *A. insularis* Barber (1953). R. T. Schuh (American Museum of Natural History, New York) and K. Schmidt (Hillsdale, NY) offered suggestions to the original typescript. These two taxa are not congeneric with *P. hyalinus*. Christina Jordan (Univ. California, Berkeley) aptly rendered all figures on Plate 2. To all the above we express our appreciation.

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nae) (Wygodzynsky and Štys, 1970) and three in the Old World (Disphaerocephalinae, Phallopiratinae, and Monteithostylinae) (Štys, 1985; 1977). A dozen species are known from North America (Henry and Froeschner, 1988) and 13 genera with 89 species are known from the New World (Grimaldi et al., 1993; Wygodzinsky and Schmidt, 1991). The Disphaerocephalinae are known only from fossil species and the Aenictopecheinae includes both annectant and fossil species. The fossils are in Burmese amber, estimated roughly from 36-66 mya (Štys, 1969).

The Alienatinae, which includes three fossil and 12 living species, are characterized by the presence of clustered apicitibial spines, body less than 2.0 mm long, tarsal formula 1-1-1, laterally placed tarsi at tibial apical margins, bilobed pronotum, reduced fore wing venation consisting of one to three main veins, zero to one crossvein, and hind wings with, at most, a costal vein remnant. *Paralienates* is a very distinctive member of the subfamily. Alienatinae extends back 25-40 mya with a range from Arizona and Florida to Central America and the Greater Antilles to Hispaniola (Barber, 1953; Kritsky, 1981). Three species are also known from the Lesser Antilles.

METHODS AND DESCRIPTIONS

The description, measurements, and illustrations of the specimens were performed when the amber piece was submerged in oil. Drawings were made with a camera lucida. All measurements are in millimeters.

Enicocephalidae Stål, 1860
Alienatinae Barber, 1953
Paralienates

Type species. — *Paralienates hyalinus* n. sp.

Diagnosis. — Reduced fore wing venation, costa distinct, subcosta weakly developed, vein pilosity simple, both wings much longer than abdomen; fore tarsi over two times as long as wide at base, all tarsi with two elongate, subequal, slender claws, apicitibial spines laterad, short, blunt.

The laterally grouped apicitibial spines, small body size, bilobed pronotum, reduced wing venation, and tarsal formula 1-1-1 places *Paralienates* in the Alienatinae and, consequently; close to *Alienates*. *Paralienates* keys out to *Alienates* in Wygodzinsky and Schmidt (1991) but the marginal fracture and wing coupling mechanisms are not evident. The anterior pronotal lobe is weakly defined whereas in *Alienates* spp. it is well defined. The subtrapezoidal posterior pronotal lobe has sharp humeral angles instead of round ones as in the mostly oval lobe

of *Alienates*. Males of *A. millsi* and *A. insularis* also have subtrapezoidal pronota but have a well defined anterior lobe and a vestigial posterior lobe. *Alienates insularis* is a highly variable species. Both taxa have sharp apicitibial spines and legs not granulose. Several authors have considered as apical the tarsal position on the two distal most legs as they are in other enicocephalid subfamilies (e.g., *Gamostolus*, Aenictopecheinae; *Enicocephalus*, Enicocephalinae). However, in the Alienatinae, there is a bristle comb on the apical margin of the last two pairs of tibiae; thus a laterally inserted tarsus usually results. This condition is evident in *Alienates dudichi* (Vasarhelyi, 1982) and in *Paralienates* but less evident in *A. robertoi* Wygodzinsky and Schmidt (1991). The single vein of the fore wing and the position of the tarsi on all tibiae, expand slightly Barber's (1953) definition of the subfamily.

Paralienates differs from other fossil Enicocephalidae as follows: *Paenicotechys* (Aenictopecheinae) has an elongate anteocular lobe, dorsally contiguous eyes, and slightly reduced fore wing venation. *Disphaerocephalus* (Disphaerocephalinae, monotypic) has very long and thin extremities, densely pubescent body; pronotum with lateral margins not divided into distinct lobes, apparently three segmented, longer than wide, dorsal surface with a recognizable, convex collum, medial triangular depression, and densely and deeply alveolate lateral swellings (Štys, 1969). Obviously, these three genera do not form a monophyletic group.

Description. — Head moderately, finely granulose, trilobed; eyes large; ocelli distinctly elevated; antennae and rostrum four segmented; pronolum bilobed, subtrapezoidal, first lobe short and weakly defined, posterior well elevated towards base and humeral angles; femora, tibiae, and tarsi with conspicuously setigerous granules; tarsal formula 1-1-1, tarsi attached to lateral side of tibial apex, all with two subequal, slender claws; fore tarsus over two times as long as wide at base, fore leg with one group of short, blunt, apicitibial spines, with no tarsal spines or modified seta (a male characteristic); apical comb not discernible; fore wings with distinct costal vein only, subcosta partially and weakly developed, traces of S + Cu represented by sparse pilosity; hind wings veinless, both much longer than abdomen, with relatively long setae in single file; abdomen with ventral setigerous granules, genital capsule with defined lateral, immobile parameres, guide not evident; body mostly glabrous.

Remarks. —*Alienates* Barber 1953, the only other genus in this subfamily, differs from *Paralienates* by possessing the following characteristics: ocelli only slightly elevated; long, sharp apicitibial spines and apical comb; fore wings with two to four veins, hind wings with traces of veins at their base; posterior pronotal lobe suboval,

rounded laterally (except in male *A. insulararis* and *A. millsi* where it is subtrapezoidal); legs agranulated; no setigerous granules on lateral margins of last abdominal segments. The limits of the Alienatinae are redefined to include species with one to four longitudinal veins in the fore wing and hind wing veinless or with only a slight indication of veins at the base.

Etymology. — The Greek adjective *para* refers to the closeness or overall similarity of this genus to *Alienates*.

Material. — The studied specimen was in a nearly parallelepipedal (6 × 5 × 2 mm), polished piece of pale orange-yellow amber (0.1 g). The piece originated from the amber mines in the northern Dominican Republic whose age is 25-40 million years (lower Oligocene to upper Eocene) (Lambert et al., 1985; Schlee, 1990).

Paralienates hyalinus n. sp.
Plates 1 - 3

Diagnosis. — With weakly defined costal vein on forewing; wings surpass abdominal apex by almost an abdomen length; legs granulose, apicitibial spines short, blunt.

Description. — Male. Head moderately, finely granulose, trilobed, including tylus, as long as pronotum (0.33); constriction behind eyes deep, strong; middle lobe globular, narrower than head across eyes (0.14:0.15), transversely wider than long (0.15:0.06); posterior lobe wider than long, in lateral aspect, surpassing surface of gula, almost level with inferior surface of eyes. Length of antennal segments: I, 0.06; II, 0.13; III, 0.12; IV, 0.19; all glabrous, fusiform. Rostrum reaching about anterior third of eyes, four segmented; third segment cylindrical,

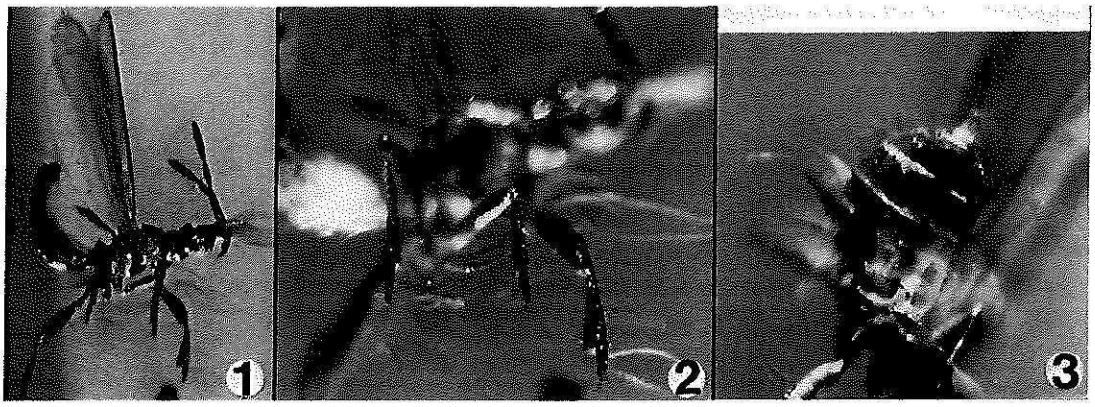

PLATE 1.
FIGURE 1. Complete specimen, lateral.
FIGURE 2. Legs.
FIGURE 3. Abdomen, ventral. Arrowhead points setigerous spines.

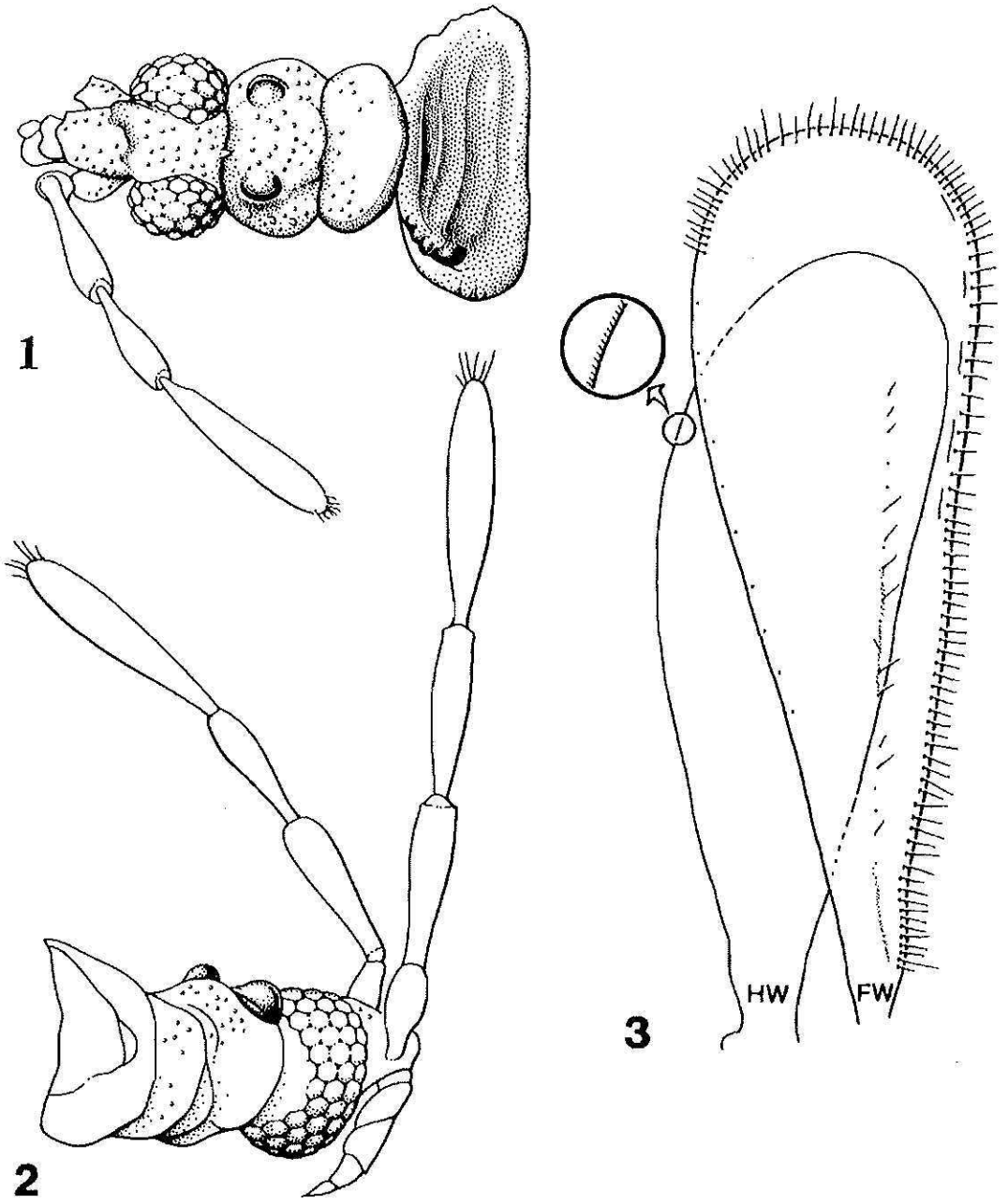

PLATE 2.
FIGURE 1. Head and pronotum, dorsal.
FIGURE 2. Head and pronotum, lateral.
FIGURE 3. Wings (FW= fore wing, HW = hind wing). Detail of margin of HW encircled.

nearly twice as long as fourth (0.07:0.04), relatively stout. Eyes large, upper margin almost level with vertex, lower margin surpassing gula by a distance slightly longer than thickness of fourth antennal segment; interocular space slightly wider than width of eye from above.

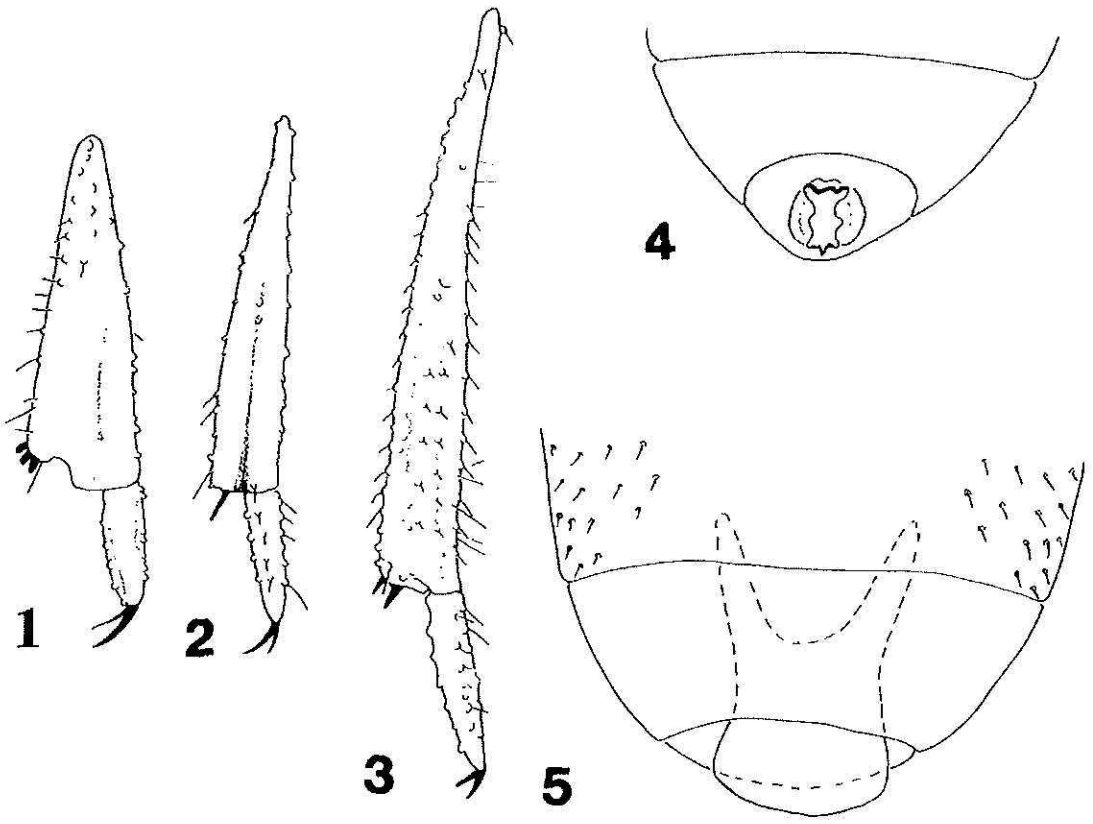

PLATE 3.
FIGURE 1. Right anterior tibia and tarsus, retrolateral.
FIGURE 2. Right mid tibia and tarsus, retrolateral.
FIGURE 3. Left hind tibia and tarsus, retrolateral.
FIGURE 4. Terminal abdominal segments and genital capsule, dorsal.
FIGURE 5. Terminal abdominal segments, ventral.

Ocelli relatively large (0.02), distinctly elevated, separated from each other by distance greater than their length (0.04).

Anterior lobe very short, without projections, smooth, barely separated from posterior lobe; posterior lobe subtrapezoidal (middle and posterior lobes fused, only shallow depression between both) wider than long (0.22:0.16); surface granulated, without ridges, well elevated towards its base; posterior margin very broadly and shallowly concave. Scutellum hidden by wings, thus could not be described.

Coxae long, conical; femora cylindrical, tapering at both ends; tibiae triangularly elongate; femora, tibiae, and tarsi abundantly granu'ate, granulations subconical. Lengths and widths, as follows: leg I, coxa (0.12:0.03), femur (0.22:0.06), tibia (0.16:0.05), tarsus (0.08:0.03), leg II, coxa (0.09:0.05), femur (0.20:0.03), tibia (0.18:0.04), tarsus (0.07:0.02), leg III, coxa (0.11:0.06), femur (0.25:0.05), tibia (0.23:0.03), tarsus (0.09:0.02). Fore tibia three times as long as wide across apex (0.16:0.5).

Tarsi straight, longer than apical width of tibiae; first almost 2.5x as long as wide at base.

Fore wing with costal vein only, reaching past apex, not well defined at inner margin (Sc) evident in some parts only; blade glabrous; fringed by a row of short, fine, regularly spaced setae, "hair sockets" large and visible through the hyaline blade; hind wing shorter than fore, fringed by microsetae.

Abdomen 0.49; with eight evident abdominal segments and long, setigerous granules on connexival margins of segments 4-7; genital capsule more sclerotized than rest of abdomen, immobile parameres evident, guide absent or minute. Total body length 1.15.

Etymology. — The Greek, masculine adjective *hyalinus* refers to the translucent or glossy appearance of the wings.

Repository. — The specimen (HE-4-24) is deposited in the Poinar collection of Dominican amber maintained at Oregon State University, Corvallis, Oregon.

DISCUSSION

Wygodzinsky and Schmidt (1991) pointed out the great plasticity of the characters of the American enicocephalids, especially *Alienates*, with the consequent difficulties in separating them. In the same way that the Alienatinae could be part of the Enicocephalinae, *Paralienates* could be part of *Alienates*. The differences between these genera could disappear with the finding of additional adult males and females, both living and fossil. The evolutionary and functional significance of the reduced venation in *Paralienates* is difficult to interpret.

There are fifteen described species of *Alienates*. Most species live in the Caribbean basin and they have been collected on dead stumps and in tree holes at low elevations in tropical evergreen forests. Very little is known about the biology of *Alienates* and its presumed close relatives. We suggest that *Paralienates* fed on microarthropods as other extant enicocephalids do.

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