A new antlion from Dominican amber (Neuroptera: Myrmeleontidae)

G. O. Poinar[a] and L. A. Stange[b,*]

[a]*Department of Entomology, Oregon State University, Corvallis (Oregon 97331, USA)*
[b]*Florida Department of Agriculture and Consumer Services, Division of Plant Industry, FSCA, P.O. Box 147100, Gainesville (Florida 32614, USA), Fax +1 904 955 2301*

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Abstract. A new fossil species of antlion, *Porrerus dominicanus*, is described from Dominican amber. Extant species of *Porrerus* are found only in South America and Panama. A review of the current knowledge of fossil Myrmeleontidae is provided.

Key words. Antlion; Dominican amber; fossil; Myrmeleontidae; Neuroptera.

A new species of antlion from Dominican amber is the second known fossil of this family from the Tertiary period. The adult preserved in Dominican amber is estimated to be 35–40 million years old. The excellent state of preservation of this specimen has allowed us to identify it as a new species of *Porrerus* Navás. This genus is found today only in South America (Venezuela to Uruguay) and Panama. A review of the current knowledge of fossil Myrmeleontidae is provided.

Present knowledge of fossil Myrmeleontidae

The oldest known fossil antlions are from the Early Cretaceous, about 130 million years ago. These are represented by 6 species in 5 genera described by Martins-Neto and Vulcano[1]. The excellent impressions are from the Crato limestone from the base of the Santana Formation of the Upper Aptian, which is part of the Araipe Basin in the state of Ceará, N.E. Brazil. These species are included in the subfamily Araripeneurinae by Martins-Neto and Vulcano. The elongate hypostigmatic cell, wing venation in general, and the relatively short, clavate antenna (present in several fossil species) would place these species in the Myrmeleontidae. Three modern subfamilies are usually recognized: Stilbopteryginae, Palparinae, and Myrmeleontinae. The Brazilian fossil species elongate hypostigmatic cell and type of antenna would preclude placing in the Stilbopteryginae, which has a short hypostigmatic cell similar to that found in the Ascalaphidae. These genera also do not appear to belong to the Palparinae, in which the great majority of genera have the hindwing vein CuA curving forward acutely at its junction with the posterior branch of MP 2 ('Recurrent Vein'). However, *Araripeneura* Martins-Neto and Vulcano appears to have the forewing vein CuP free from vein 1A which is typical of the Palparinae. Unfortunately, the base of the forewing is not sufficiently preserved in the other genera to know the condition of forewing vein CuP (whether fused or not). The only palparine genera now found in South America belong to the Dimarini (*Dimares* Hagen and *Millerleon* Stange). Whether these genera evolved from *Araripeneura* relatives or from some other stock is highly conjectural. One other genus, *Caririneura* Martins-Neto and Vulcano, has the hindwing so highly modified (approaching the Nemopteridae) that this genus can be excluded as an ancestor of any modern Myrmeleontidae. However, judging from the drawings given by Martins-Neto and Vulcano, the other three genera[1] (*Pseudonymphes*, martins-Neto and Vulcano, *Caldasia* Martins-Neto and Vulcano, and *Blitterdorffia* Martins-Neto and Vulcano) are not easily separated from modern Myrmeleontinae. All the species described appear to be relatively small (forewing lengths between 15 and 28 mm). These five genera seem to be quite distinct from each other (probably at least 3 different major groups) and indicate the richness of the Cretaceous antlion fauna of northeastern Brazil.

The only other possible antlion fossil described from the early Cretaceous is by Whalley[2]. This species in preserved in amber from Lebanon and the fragmentary remains of the wing precludes much discussion about its relationships. Whalley questionably placed it in the Myrmeleontidae, but it could also be placed in some other myrmeleontoid family such as the Ascalaphidae.

Rice[3] described *Palaeoleon ferrugineum* based only on the distal half of the forewing from the Redmond iron deposits in Labrador, Canada (Red argillite) and listed its age as Upper Cretaceous. The absence of the hypostigmatic cell eliminates it from the Myrmeleontidae.

Statz[4] described *Dendroleon septemmontanus* from a wing impression of greenish gray slate from the Siebenburg Test area of Germany. Only the apical half of the forewing is present and agrees with modern *Dendroleon*.

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* Corresponding author.

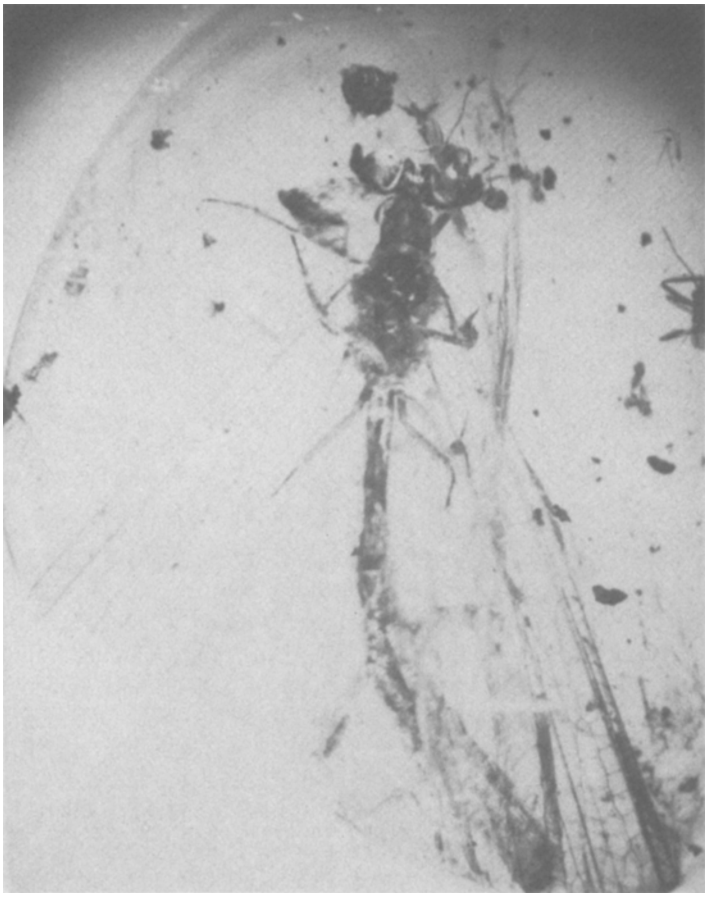
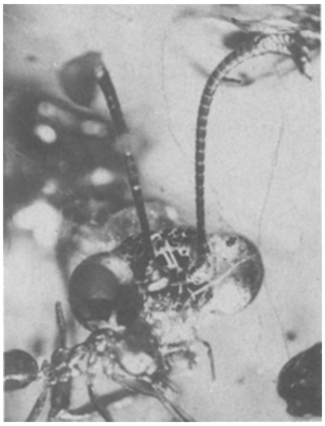


Figure 1



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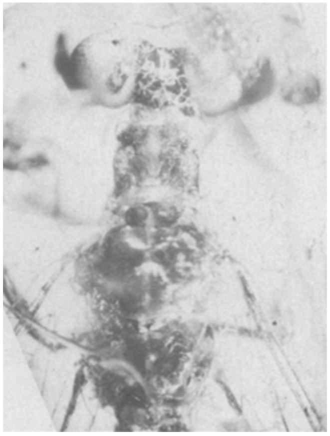

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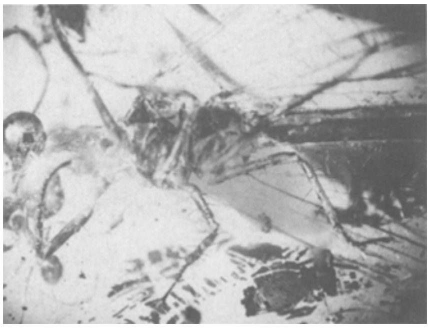

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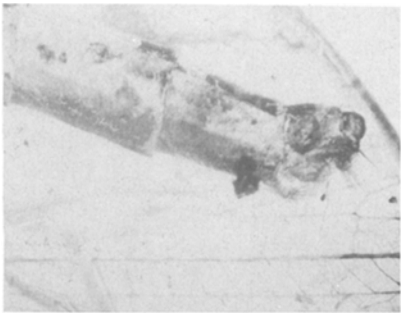

Figure 5

Figures 1–5. Photographs of *Porrerus dominicanus* in amber. *1)* Ventral view, whole insect; *2)* Frontal view of head; *3)* Dorsal view of head and nota; *4)* Lateral view of head and thorax; *5)* Lateral view of female terminalia.

Carpenter[5] listed the age of the fossil as Oligocene (about 35 million years ago).

In summary, the origin of the family Myrmeleontidae can be traced back to the early Cretaceous (about 130 million years ago), but the described species cannot be unequivocally referred to any modern group. However, two fossils known from the Oligocene Period (about 35 million years ago) can be referred to modern genera, *Dendroleon* Brauer and *Porrerus* Navás.

Porrerus dominicanus Poinar and Stange, new species (cf. (figs. 1–8) Holotype female, Mina La Toca, Dominican Republic (deposited in the collection of Jim Work, Ashland, Oregon).

Length approximately 21 mm from head to apex. Head (fig. 2) with interantennal distance slightly more than greatest scape diameter; greatest ocular width about equal to interocular distance; antenna with about 36 flagellomeres; pronotum slightly wider than long; hind-

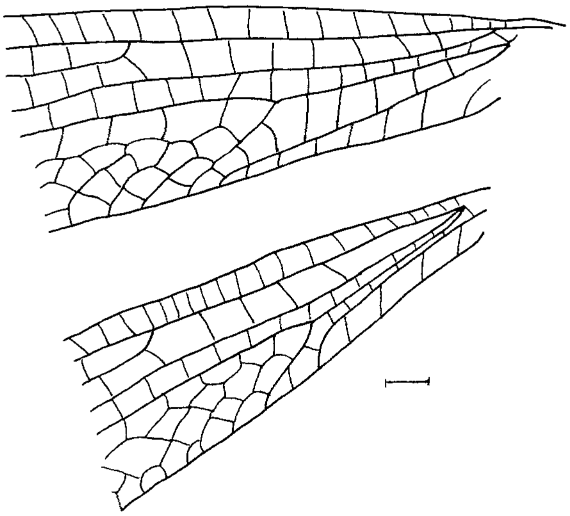

Figure 6

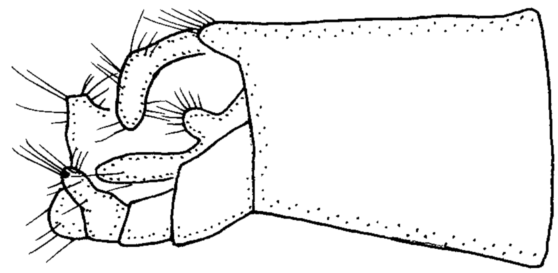

Figure 7

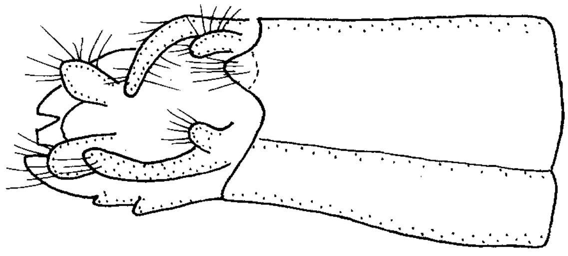

Figure 8

Figures 6–8. Sketches of *Porrerus dominicanus*. 6) Basal half of wings; 7) Lateral view of female terminalia; 8) Ventral view of female terminalia. Bar line represents 1 mm.

wing (fig. 6) about $\frac{1}{2}$ as wide at base as forewing; radial sector arises well beyond cubital (forewing) and medial (hindwing) forks; forewing with costal area above radial sector with costal cell about 1.5 × higher than wide, more basal costal cells wider than high; forewing with 7 presectoral crossveins; forewing with 6 crossveins between CuP + 1A and hind margin; hindwing with costal cell above radial sector about as high as wide, similar to most basal cells; hindwing presectoral area with 4 crossveins; hindwing with 4 crossveins between CuA and hind margin; foreleg < midleg < hind leg; femora and tibiae with black setae, longer than greatest femoral diameter; all setae situated laterad of closing face; forefemur and foretibia with 2 setae, midfemur, midtibia, hindfemur and hindtibia with 2 rows of 3 setae; tibial spurs as long or slightly longer than basal three tarsomeres; hindbasitarsus of foreleg and midleg about 2.5 × longer than greatest diameter, that of hindleg about 3.0 × longer than greatest diameter; pretarsal claws shorter than basal four tarsomeres, about $\frac{1}{2}$ length of distaltarsomere which is longer than basal four tarsomeres together. Abdomen shorter than wings; female terminalia (figs. 5, 7, 8) with ectoproct with projecting lobe ventrally beset with several stout setae; posterior gonapophysis about 5.0 × longer than greatest diameter, somewhat swollen and curved medially, with only fine setae; anterior gonapophysis a little longer than medial diameter; posterior gonapophysis elongate, with several digging setae subapically; pregenital plate absent; sternite VII with medial lobe posteriorly, longer than basal width, with many stout setae projecting posteriorly from posterior part. Coloration primarily dark brown; face with dark brown band below antenna, pale on lower frons and clypeus; vertex dark brown with evident pale brown scars (figs. 2, 3); antenna dark brown with pale brown apical ring on flagellomeres; pronotum mostly brown with pale brown areas laterally, especially at anterolateral margin; forecoxa, femora and tibiae mostly light brown (fig. 4); tarsi mostly dark brown.

Discussion

The well-preserved amber specimen shows clearly the generic characters of *Porrerus* Navás 1913, which belongs to the tribe Myrmeleontini. The wing venation (fig. 6) is typical for the tribe Myrmeleontini with the radial sector arising well beyond the cubital fork (forewing) or medial fork (hindwing), with many presectoral crossveins. The female terminalia (figs. 7, 8) are especially characteristic of *Porrerus*, with elongate, curved posterior gonapophysis and the medial projection from the posterior margin of sternite VII. The head (fig. 2) is also *Porrerus*-like with the antennal fossae relatively close as opposed to *Myrmeleon* which has the antennal fossae more widely separated. The elongated tibial spurs and longer setae on the ventral surface of the distal tarsomere are also distinctions from *Myrmeleon*. Navás[6] placed this genus in a separate tribe, Porrerini Navás 1913. The larvae of several species of *Porrerus* are now known and are identical to those of *Myrmeleon*. The larvae of the extant species live in caves or rock overhangs and construct pit-fall traps identical to those of *Myrmeleon*.

There are two described and two undescribed extant species of *Porrerus* known to the authors. The two described species are from Brazil and Paraguay and are larger species (about 35 mm in body length). These two species have the basal costal cells higher than long. The two undescribed species are from Venezuela. One is quite distinct from *P. dominicanus* in having the meso- and metapleura sharply divided near midline into dark brown above and light brown below. This species is also larger (about 35 mm in female). The other undescribed species from Venezuela appears to be closely related to *P. dominicanus* in wing venation and size. Differences between *P. dominicanus* and the Venezuelan species are the light brown scars on the vertex of *P. dominicanus*, the infuscate femora of the Venezuelan species and minor venation differences. These consist of 5 hindwing presectoral crossveins in the Venezuelan species, only 4 in *P. dominicanus*. Also, the hindwing posterior area appears narrower in *P. dominicanus*.

The present day antlion fauna of Hispaniola consists of 12 species in five genera. These genera are *Abatoleon* Banks, *Eremoleon* Banks, *Psammoleon* Hagen, *Myrmeleon L.* and *Vella* Navás.

La Toca mine is located between Santiago and Puerto Plata in the Cordillera Septentrional of the northern portion of the Dominican Republic. The mine is in the Altimira facies of the EL Mamey Formation, which is shale-sandstone interspersed with a conglomerate of well-rounded pebbles[7]. Differences in the magnitudes of absorption peaks in nuclear magnetic resonance spectra of the exo-methylene group of amber is one method of dating amber[8]. Several mines in the Dominican Republic were used to calibrate the ages of the various mines. The age of the Palo Alto mine (20–23 million years based on foraminifera counts) was used as the standard[9]. The ages of the various mines ranged from approximately 25 to 40 million years; that of the La Toca mine was the oldest, some 35–40 millions years before present (lower Oligocene to upper Eocene).

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