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## First description of fossil *Acanthostichus* from Dominican amber (Hymenoptera: Formicidae)

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The new fossil species, *Acanthostichus hispaniolicus* from Dominican amber, is described from 4 workers in a single amber sample. This is the first species of the genus in the fossil record. *A. hispaniolicus* is a member of the *brevicornis* complex as defined by MACKAY (1996). *A. hispaniolicus* is most similar to two recent species from Vera Cruz, Mexico: *A. skwarrae* WHEELER from Tamarindo and *A. quirozi* MACKAY from Tuxtla. A striking character of *A. hispaniolicus* is the presence of a preapical tooth on the masticatory margin of the mandibles, a character previously known only in *A. arizonensis* MACKAY. No *Acanthostichus* species has been reported in the recent fauna of Hispaniola. During the Early or Middle Tertiary *Acanthostichus* was present on Hispaniola and apparently became extinct from the island after that time.

Keywords: Dominican amber, Tertiary, Formicidae, Cerapachyinae, Acanthostichini, fossil ants, *Acanthostichus hispaniolicus*

### INTRODUCTION

The subfamily Cerapachyinae contains 3 tribes: Cerapachyini, Acanthostichini and Cylindromyrmecini. The tribe Acanthostichini comprised two genera: *Acanthostichus* MAYR and *Ctenopyga* ASHMEAD. The genus *Ctenopyga* ASHMEAD (1906) was described based on a gyne and two males from La Puerta (Mexico) and referred to as *townsendi* ASHMEAD. EMERY (1911) considered *Ctenopyga* as a subgenus of *Acanthostichus*, including in it *A. texanus* FOREL (one also based on a gyne) and *A. townsendi*. SMITH (1947) presented a list of characters that one could expect to find in the workers of the two species of the subgenus *Ctenopyga*. A few years later SMITH (1955) formally proposed the synonymy of *townsendi* and *texanus*. BROWN (1973) also considered *Ctenopyga* as a synonym of *Acanthostichus* without justification. Two years later BROWN (1975) suggested provisionally restoring *Ctenopyga* to generic status because the genitalia and antennae of a syntype male of *townsendi* are different from those of the other males of *Acanthostichus*. He also added that the supposed male of *C. texana* (= *townsendi*) could belong to *Cerapachys* SMITH, stating that, if so, *Ctenopyga* should be regarded as a genus distinct from *Acanthostichus*. *Acanthostichus* was recently revised by MACKAY (1996) who considers *Ctenopyga* a synonym of *Acanthostichus* because “the male of *texanus* is similar to the other species in most respects, although the genitalia are quite different”. The genus *Acanthostichus* in this sense comprises 22 species, all distributed in the New World, from southern U.S.A. to northern Argentina. According to MACKAY (l.c) the species of *Acanthostichus* are very similar to each other and only a few characters are useful to separate the workers; in particular, the shape of the petiole, of the scape and of the clypeus. MACKAY (1996) recognizes three species complexes in *Acanthostichus*: *brevicornis* EMERY, *serratus* SMITH, and *texanus* FOREL. The species of *Acanthostichus* are known to be predaceous and carnivorous

(SMITH, 1947) and termite hunters (BROWN, 1975). The presence of the genus *Acanthostichus* in Dominican amber was recorded by BARONI URBANI (1995) without further discussion. His record is based on the same specimens described in the present study. This is the first detailed record of the genus *Acanthostichus* from the Greater Antilles from which no living species have been recorded. The discovery of this fossil species on Hispaniola proves the existence of the genus on the island during Early or Middle Tertiary. The extant *Acanthostichus* species are recorded in the ant literature as termite hunters and the amber sample from which the new species is described below contains five termite workers (see below). According to BARONI URBANI & SAUNDERS (1982) termites of all castes are frequent in Dominican amber. It is likely that during the Tertiary, *Acanthostichus* was also feeding on termites as its recent relatives. It is difficult to formulate a reasonable hypothesis to explain the apparent extinction of the genus on the island.

#### MATERIAL AND METHODS

The following four specimens of *Acanthostichus* from the Dominican Republic (reference number Do-5205) have been examined in the amber collection of the

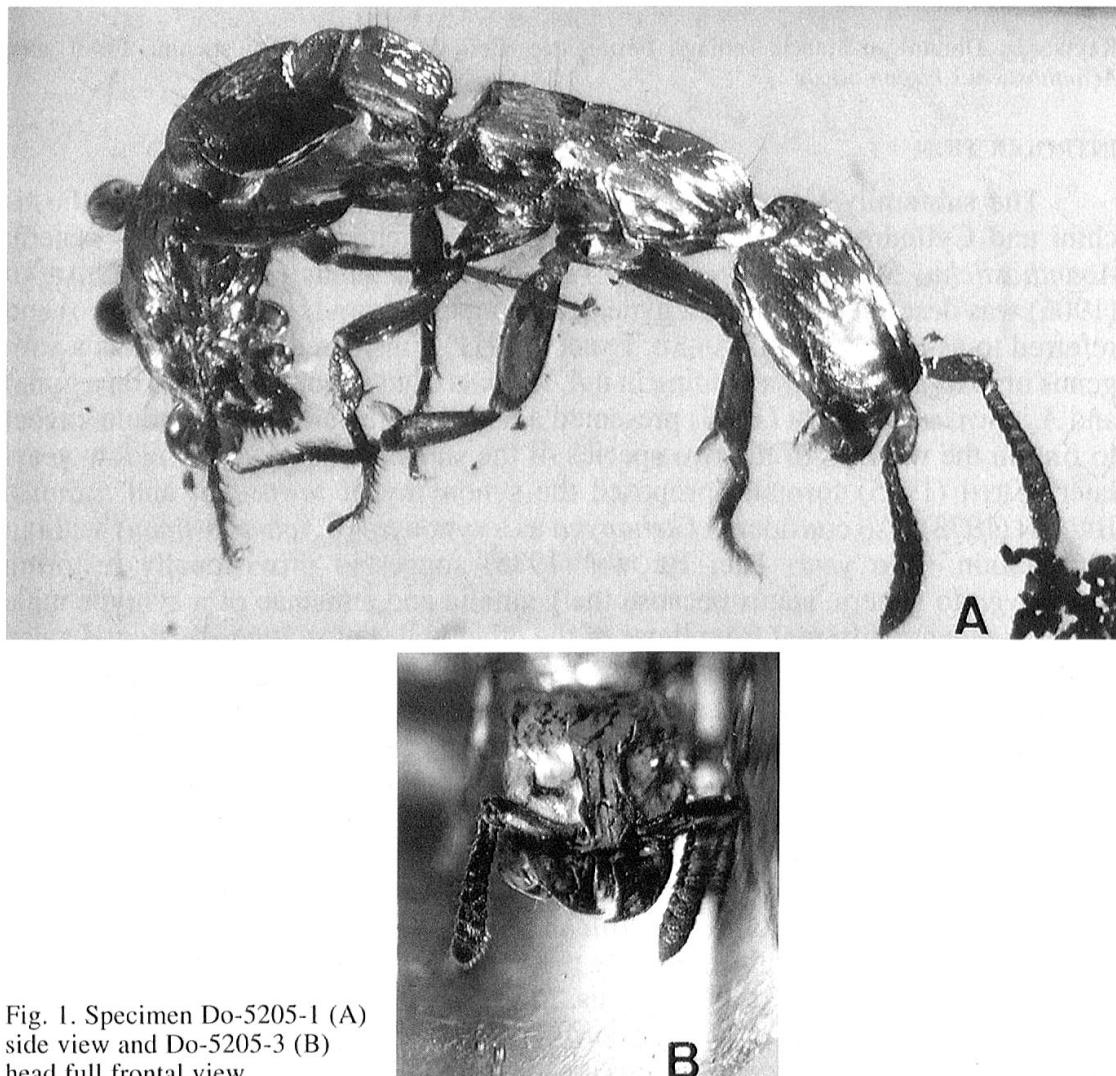


Fig. 1. Specimen Do-5205-1 (A) side view and Do-5205-3 (B) head full frontal view.

State Museum of Natural History, Stuttgart (Department of Phylogenetic Research). The sample contained 4 workers of *Acanthostichus*, 13 workers of *Oxyidris* WILSON, 5 termite workers, a beetle, an unidentified larva, and impurities. The 4 workers of *Acanthostichus* have been separately cut, polished, and numbered respectively as Do-5205-1 to Do-5205-4. The preservation condition of the ants can be considered as good, though the specimens Do-5205-1 (holotype of the new species; Fig. 1A) and Do-5205-2 (paratype) have been subject to some deformation, the specimen Do-5205-3 (paratype; Fig. 1B) suffered from some dorsoventral compression, and the specimen Do-5205-4 is completely burned and wrinkled. For this reason, the schematic drawing of the profile (Fig. 2 A) is a reconstruction based on different parts of the holotype (head) and on the paratype Do-5205-2 (mesosoma, petiole, gaster and coxae). The drawing of the dorsal view (Fig. 2 B) is based on the holotype (head, mandibles, mesosoma and the posterior two thirds of the petiole), on the paratype Do-5205-2 (antennae), and on the paratype Do-5205-3 (anterior third of the petiole).

Measurements and indices used in the descriptions are as defined by MACKAY (1996) for this genus. Most of the measurements, drawings, and photographs were made on amber in 66% sucrose solution to reduce optical deformation of the specimen.

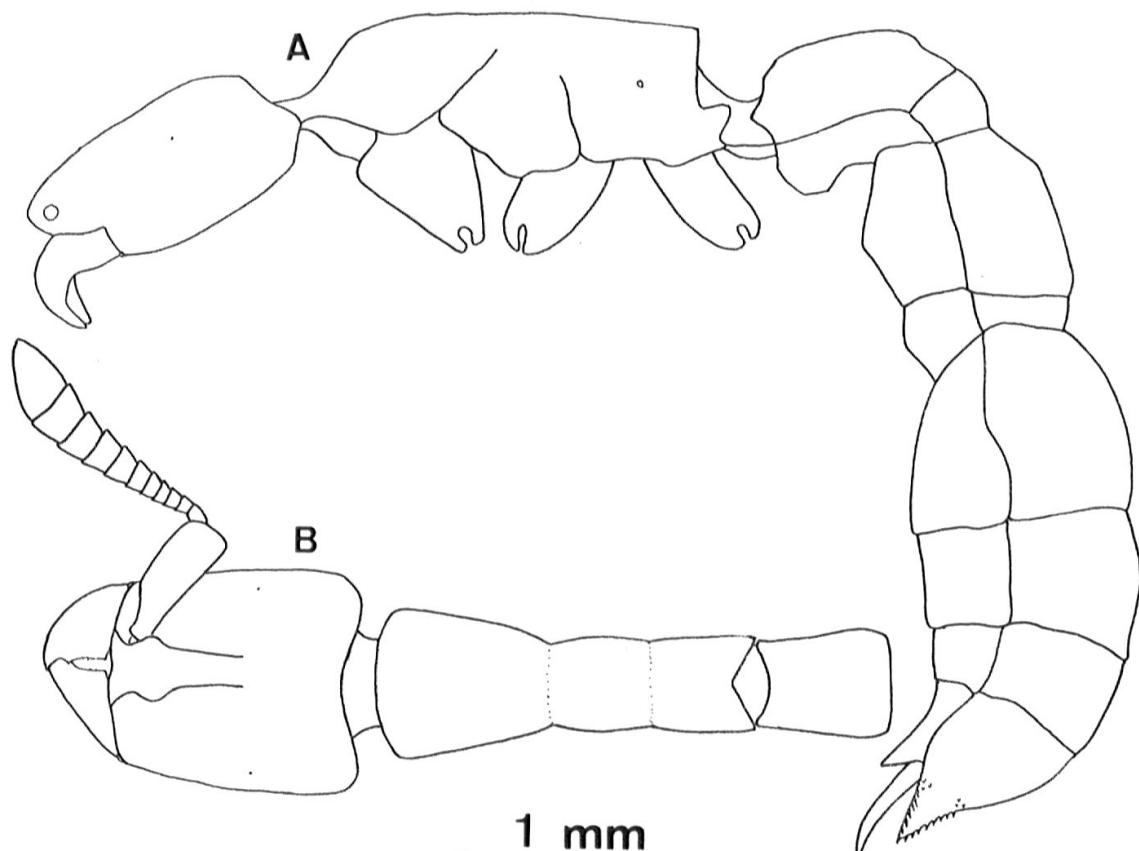


Fig. 2. Schematic drawings of *Acanthostichus hispaniolicus* n. sp. – (A) reconstruction in side view (legs omitted) based on different parts of the holotype (head) and on the paratype Do-5205-2 (mesosoma, petiole, gaster and coxae). (B) reconstruction in dorsal view (gaster and legs omitted) based on different parts of the holotype (head, mandibles, mesosoma and posterior two thirds of the petiole), on the paratype Do-5205-2 (antennae), and on the paratype Do-5205-3 (anterior third of the petiole).

## DESCRIPTION

*Acanthostichus hispaniolicus* n. sp.

Holotype: Worker in the amber sample Do-5205-1 of the collection of the State Museum of Natural History, Stuttgart, (Department of Phylogenetic Research). – Paratypes: Three workers included in the same piece of amber and separate for the present study and labelled Do-5205-2 to Do-5202-4, all deposited in the same collection as the holotype.

Diagnosis. – An *Acanthostichus* species close to *skwarrae* WHEELER and *quirozi* MACKAY but differing from both by the following characters: masticatory margin of the mandibles with a preapical tooth instead of edentate as in *skwarrae* and *quirozi*; basal and declivous faces of the propodeum laterally angulate instead of without angle as in *skwarrae* and *quirozi*; posterior border of the basal face impressed dorso-medially instead of without impression as in *skwarrae* and *quirozi*; size of petiole 0.56–0.68 mm instead of  $\leq 0.44$  mm as in *skwarrae* and *quirozi*.

Description. – Head subrectangular, slightly longer than broad and with subparallel sides. Margin of vertex slightly concave. Angles of vertex rounded. Clypeus gently convex medially and weakly concave laterally. Anterior border of the clypeus dorsally raised and connected with the frontal carinae. Frontal carinae relatively broad and long anteriorly with a superficial sulcus medially. Anterior fourth of the frontal carinae with the sides diverging backwards; second fourth of the frontal carinae with the sides strongly convex and hiding the insertion of the scape; remaining part of the frontal carinae subparallel and narrowing posteriorly. Eyes with a single ommatidium. Scapes thick and about half of the head length. Anterior border of the scape slightly convex. Mandibles with the external border weakly concave. Masticatory margin of the mandibles with a series of 6–8 minute denticles followed by a small preapical tooth and by an edentate diasthema before the pointed apical tooth. Maxillary palps 2 segmented, labial palps 3 segmented.

Mesosoma in side view nearly flat dorsally. Pronotum broad anteriorly and narrowing backwards. Promesonotal suture superficially impressed. Mesonotum with subparallel sides. Propodeal suture superficially impressed. Basal face of the propodeum with the sides slightly convex; posterior border of the basal face separate from the declivous border by a pair of acute angles on the sides which are medially separate by a superficially marginate, deep angle.

Petiole in dorsal view  $\frac{1}{3}$  longer than broad, with subparallel sides, narrow anteriorly. Subpetiolar process large. Anterior and ventral borders of the subpetiolar process round to truncate; posterior border straight. Postpetiole with the sides broadening backwards. First gastric segment larger than the postpetiole. Pygidium subtruncate; its anterior part bearing few irregularly distributed small denticles followed by a row of larger teeth up to the apex. Sting well developed and long.

Femora and tibiae weakly incrassate. Hind metatarsi slightly shorter than the hind tibiae.

Sculpture. Body smooth and shining, with sparse minute piliferous foveae. Pleurae, sides of the petiole, and pygidium less shining and with superficial, minute reticulation and punctuations.

Pilosity. Body covered by long, sparse, thin, erect, pointed hairs, one on each scape, 11–15 on the head dorsum, 5–8 on the pronotum, 7–11 on the petiole, 45–70 on the gaster, longer on the pygidium, sparser on the legs. Antennae and legs with

additional sparse, short, pointed hairs, thicker and denser on the tarsi. Funiculus with additional dense, very short hairs.

Colour. Light orange-brown with darker funiculus, mandibles, tarsi and tarsomeres.

Measurements (in mm) and indices: TL: (mandibles included) holotype 5.72, paratypes 6.20–6.64; HL: holotype 0.92, paratypes 1.14(deformed head)–1.26; HW: holotype 0.80, paratypes 0.80–1.04; SL: holotype 0.48, paratypes 0.52–0.55; SW: holotype 0.15, paratypes 0.17–0.20; WL: holotype 1.60, paratypes 1.56–1.60; pronotum maximum width holotype 0.60, paratypes 0.58–0.72; petiolar node maximum length: holotype 0.56, paratype (Do-5205-3) 0.68; petiolar node maximum width: holotype 0.42, paratype (Do-5205-3) 0.57; CI: holotype 86.9, paratypes (deformed head) 63.5–91.2; SI: holotype 52.2, paratypes 41.2–48.2.

Derivatio nominis: *hispaniolicus* is a neologism indicating the provenance from the island of Hispaniola.

*A. hispaniolicus* is a member of the *brevicornis* complex (MACKAY, 1996). This complex includes nine recent species: *A. arizonensis* MACKAY (from Arizona), *A. brevicornis* EMERY (from Guyana, Brazil and Argentina), *A. brevinodis* MACKAY (from Brazil), *A. femoralis* KUSNEZOV (from Brazil and Argentina), *A. fuscipennis* EMERY (from Venezuela and Brazil), *A. punctiscapus* MACKAY (from New Mexico), *A. quirozoi* MACKAY (from Mexico), *A. sanchezorum* MACKAY (from Colombia) and *A. skwarrae* WHEELER (from Mexico). Of the nine species of this complex, *A. hispaniolicus* is most similar to the two species from Vera Cruz, Mexico: *A. skwarrae* and *A. quirozoi*. *A. skwarrae*, *A. quirozoi* and *A. hispaniolicus* share many characters, including the large and long frontal carinae, the petiole longer than broad, broader posteriorly and with a slightly concave anterior face, the large ventral petiolar process, the shining petiolar dorsum, and the postpetiole longer than broad. *A. hispaniolicus*, in addition, shares with *A. skwarrae* the gently concave external border of the mandibles and the concave anterior face of the petiole; and with *A. quirozoi* the concave margin of the vertex and a similar body pilosity. *A. hispaniolicus* also shares with *A. arizonensis* a prominent medial tooth on the masticatory margin of the mandibles, a character unique to those two species within the whole genus.

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