

***Heydenius dominicus* n. sp. (Nematoda: Mermithidae), a Fossil Parasite from the Dominican Republic**

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Abstract: *Heydenius dominicus* n. sp. is described as a new species of fossil mermithid nematode from Dominican Republic amber. The species is represented by two specimens of parasitic juveniles that left their insect host and became embedded in the resin. The nematodes are associated with an adult male limoniid (Diptera: Limoniidae) and an adult female mosquito (Diptera: Culicidae). The parasites are thought to have emerged from the mosquito host. This is the first report of a fossil mermithid from a Neotropical area.

Key words: culicid host, parasitic nematode, fossil.

The author received a specimen of Dominican amber containing two adult Diptera and two parasitic juvenile mermithid nematodes from D. Schlee of the Staat-

liches Museum für Naturkunde in Stuttgart, West Germany. The mermithids probably came from one of the two insects and in light of this rare and extremely interesting occurrence are assigned to the new fossil species, *dominicus*, in the collective genus of fossil mermithids, *Heydenius* Taylor, 1935.

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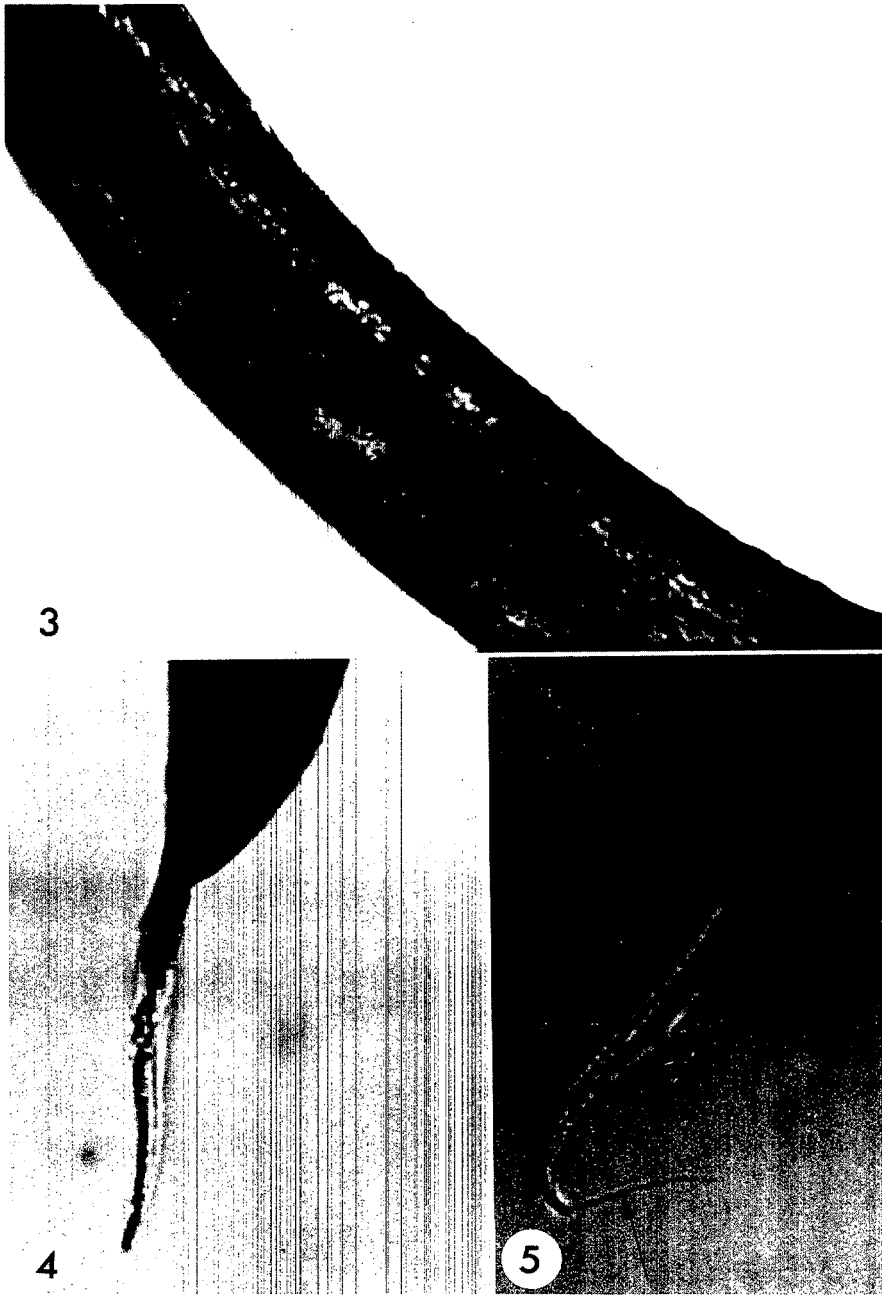
FIGS. 1, 2. 1) General view of the amber piece containing a female culicid (F), male limoniid (M), and two specimens of *Heydenius dominicus* (arrows) ($\times 16$). 2) Amber piece containing *Heydenius dominicus* Specimen 1 (A) and Specimen 2 (B) ($\times 43$).

MATERIALS AND METHODS

The clear, golden brown piece of amber was mined in the Dominican Republic and is typical in color and texture for that type of deposit. The amber was mounted in a clear plastic resin having approximately the same refractive index as the amber. The two Diptera were identified by D. Schlee as a female Culicidae and a male Limoniidae.

RESULTS

Because of the excellent state of preservation of the nematodes, including cuticular detail in the tail region, it was decided to describe both specimens as a new species of fossil mermithid in the genus *Heydenius* Taylor. This collective genus was erected by Taylor (11) for fossil mermithids that could not be placed in one of the existing genera; it contains neither type



FIGS. 3-5. 3) Detail of body wall of *Heydenius dominicus*, Specimen 1 ($\times 720$). 4) Tail of *Heydenius dominicus*, Specimen 1. Note absence of filiform tip ($\times 720$). 5) Tail of *Heydenius dominicus*, Specimen 2. Note presence of filiform tip (arrow) ($\times 720$).

species nor has any systematic position in the classification of the Mermithidae. In the present case, both of the mermithids are developing parasitic juveniles which obviously were not yet ready for an independent existence and emerged from the host during the trauma of the insect's

struggle and eventual death in the soft resin.

Heydenius dominicus n. sp.

Mermithidae Braun, 1883: *Heydenius* Taylor, 1935 (11) (Dollfus, 1950 [1], amended [7]).

TABLE 1. Fossil mermithids (Nematoda).

Name	Source	Present location	Host	Reference
<i>Heydenius antiqua</i> Von Heyden	Rhine lignite	Not known	<i>Hesthesis immortua</i> (Cerambycidae)	3
<i>Heydenius matutina</i> Menge	Baltic amber	Not known	Adult Chironomidae	5
<i>Heydenius quadristriata</i> Menge	Baltic amber	Not known	Not known	6
Undescribed	Baltic amber	Copenhagen amber collection	Adult Chironomidae	4
Undescribed	Baltic amber	Copenhagen amber collection	Adult Chironomidae	4
Undescribed	Baltic amber	Stuttgart Museum	Adult Chironomidae	10
<i>Heydenius dominicus</i> Poinar	Dominican amber	Stuttgart Museum	Adult Culicidae	Present paper

Specimen 1 (with a single coil) (Figs. 1–4): Length = 3.35 mm; greatest width = 50 μm ; terminal tail appendage = 69 μm .

Specimen 2 (with a double coil) (Figs. 1, 2, 5): Length = 3.41 mm; greatest width = 50 μm ; terminal tail appendage is separated into a proximal acute portion 69 μm long which is terminated with a fine filiform structure 25 μm long. This filiform portion could represent the tail of the pre-parasitic juvenile stage which is shed during development. In fact, it appears that *Specimen 1* has already shed this portion of its tail (Figs. 4, 5).

The cuticle of both specimens has longitudinal striations which could be remnants of the muscle bands or an artifact arising from the preservation process. The heads of both are blunt and truncated.

Type specimen: Accession number of entire amber piece is DO-3201-W. Accession number of *Specimen 1* is DO-3201-W-1; of *Specimen 2*, DO-3201-W-2. Deposited in the Museum Staatliches für Naturkunde in Stuttgart, West Germany.

Associated insects (Fig. 1): The nearest of the two Diptera to the nematodes is a male Limoniidae (sometimes treated as a subgroup of the Tipulidae). The other specimen is a female mosquito (Culicidae).

DISCUSSION AND DIAGNOSIS

The two described nematodes are undoubtedly members of the family Mermithidae. Their size, body shape, and the tail projection are typical for members of this family. Since the systematics of the family Mermithidae is based on characters

of sexually mature adults, it is not possible to identify these specimens with any extant genus or species.

One of the two insects in the piece of amber likely served as the host to these two nematodes. Our knowledge of current hosts for mermithids would suggest that the culicid and not the limoniid was the likely host. No current records of a mermithid parasite of a limoniid exist, and there is only one record of a member of the family Tipulidae (*Tipula paludosa*) being parasitized by a mermithid nematode with no mention of the parasite in the adult stage of the crane fly (8). Although only one mermithid has been recorded from crane flies, 19 species of Tipulidae have been cited as hosts for thelastomatid nematodes (7).

In contrast, some 90 species of mosquitoes have been reported as hosts for mermithid parasites (7). In addition, one ecological group of mosquito mermithids develops appreciably only in the pupal and adult stages of the host and is therefore normally found in adult mosquitoes. *Heydenius dominicus* seems to belong to this group. Three existing mermithid genera, namely *Empidomermis* Poinar, 1977, *Culicimermis* Rubtsov and Isaeva, 1975, and *Perutilimermis* Nickle, 1972, contain species that complete their development inside adult mosquitoes. Unfortunately, the lack of diagnostic characters prevents *H. dominicus* from being assigned to any of these three genera. Growth and development of *Empidomermis riouxi* in *Aedes detritus* began in the mosquito's pupal stage, and the nematodes were already approximately 10

mm long when the adult mosquito emerged (2). Obviously, the development of *H. dominicus* was considerably slower than that of *E. riouxi* in the postlarval stages of the host.

Heydenius dominicus is the first fossil mermithid described from a probable mosquito host and the first one from a Neotropical area.

A list of described fossil mermithids is presented in Table 1. Based on probable host insect and general morphology, *H. dominicus* does not appear similar to any previously described mermithid.

Dominican amber is thought to have been formed sometime between the Miocene and Oligocene eras some 25 million years ago (9).

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