

Short communication

Mermithid nematode parasites of eastern subterranean termites in North America

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The subterranean termite *Reticulitermes flavipes* (Kollar, 1837) (Isoptera: Rhinotermitidae) occurs throughout the eastern USA and populations have been found as far west as Oregon. As with other termites, eastern subterranean termites live in colonies composed of workers, soldiers and reproductives. The blind, wingless workers, which are only between 3 and 4 mm long, feed on wood and can cause serious damage to wooden structures throughout their range (Edwards & Mill, 1986). Mermithid parasitism of termites is a rare occurrence and this report represents the first case of mermithid parasitism of termites in North and Central America.

Reticulitermes flavipes were collected from logs in Whitehall Forest, Clarke Co., Athens, GA, USA (33°53'09"N; 83°21'23"W) in April 2019 and transported to laboratory cultures. Mermithids were discovered over the following 2-3 weeks when the termites were dissected for research. The nematodes were fixed in 5% formaldehyde, processed to glycerin and mounted on microscope slides. Observations and photographs were made with a Nikon SMZ-10 R stereoscopic microscope and a Nikon Optiphot compound microscope with magnifications up to 800×. Helicon Focus Pro X64 was used to stack photos for better overall clarity and depth of field.

Since the mermithids were still in the parasitic or post-parasitic juvenile stages, they lacked the adult characters needed to assign them to a current or a new genus. In such cases, mermithids can be described in the collective genus *Agamomermis* Stiles 1903. Such species are erected

for taxonomic convenience and are considered independent of the nomenclatural classification system. Collective genera highlight the presence of new lineages and associations at particular locations and times. When adult mermithids are found an official description can be made, placing the species in a known or new genus (Poinar & Welch, 1981).

Five mermithids were dissected from their respective termite hosts of which two were parasitic juveniles and the other three showed evidence of shedding their third- and fourth-stage cuticles and were considered to be early post-parasitic juveniles. A description of the three post-parasitic juveniles follows:

*Agamomermis termitivoratus** sp. n.

(Fig. 1)

Post-parasitic juveniles 590 (460-760) µm long, max. diam. = 127 (120-137) µm. Cuticle lacking cross-striations, head without apparent mouth papillae, undetermined number of cephalic papillae, tail terminus with small button-like scar.

While many characters had not completely formed or not clearly visible, the cuticle lacking cross-striations, absence of mouth papillae and tail terminus with a small

* Specific epithet from the Latin words *termes* = termite and *vorator* = devourer.

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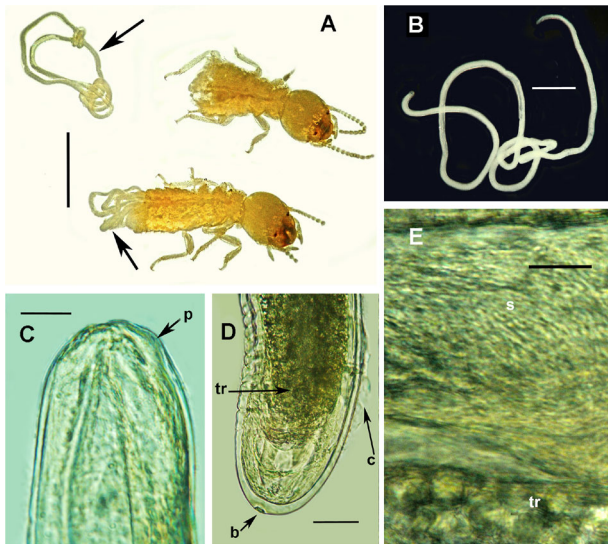


Fig. 1. *Agamomermis termitivoratus* n. sp. A: Two parasitic juveniles (arrows), one of which was removed from its termite host and the other partially protruding from the body of its termite host; B: Male post-parasitic juvenile; C: Head of post-parasitic juvenile. Arrow showing developing cephalic papilla (p); D: Tail of post-parasitic juvenile (b = button-shaped scar; c = larval cuticle flaking off; tr = trophosome); E: Portion of testis of post-parasitic juvenile with developing sperm cells (s = area with numerous spermatozoa; tr = trophosome). (Scale bars: A = 660 μm ; B = 137 μm ; C = 32 μm ; D = 50 μm ; E = 16 μm .)

button-like scar are unique features that are not known to occur in post-parasites of extant mermithid genera (Poinar, 1977, 1979; Rubstov, 1978; Artyukhovsky, 1990). Sperm were being produced in the testis of one post-parasitic juvenile.

There are very few records of mermithid nematodes parasitising termites. The earliest record appears to be by Hegg (1922) who reported an unknown mermithid attacking the European termite, *Thoracotermes brevinotus*. The only other report is by Rutledge (1925) who reported a mermithid in *Cornitermes orthocephalus* Silvestri in Brazil. It appears that *A. termitivoratus* n. sp. is the first report of a mermithid infecting termites in North and Central America.

Other types of nematodes have been found in natural populations of termites (Snyder, 1920; Poinar, 1975; Wang *et al.*, 2002). Most of these include various species of diplogastrid and rhabditoid nematodes, some of which caused mortality in their termite hosts (Merrill & Ford, 1916; Banks & Snyder, 1920; Poinar, 1990; Poinar *et al.*, 2006). The steinernematid *Neosteinerinema longicurvi-*

cauda was reported from natural populations of *R. flavipes* in Florida (Nguyen & Smart, 1994). Other species of entomopathogenic nematodes in the Steinernematidae have been shown to kill termites under experimental conditions (Poinar, 1979; Georgis *et al.*, 1982).

While mermithids have been mass-reared for biological control studies of mosquitoes (Poinar, 1979), it is still too early to evaluate the feasibility of culturing *A. termitivoratus* n. sp. for possible control of termites infesting man-made wooden structures.

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