A MERMITHID NEMATODE IN NAIADS OF DAMSELFLIES (ODONATA: COENAGRIONIDAE)

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ABSTRACT

An undescribed species of the mermithid nematode genus *Amphimermis* was found parasitizing damselfly naiads in southwestern Louisiana. This is the first record of *Amphimermis* infecting insects in North America and also the first record of mermithids in damselflies. Parasitism ranged up to 81% in individual collections and was always lethal to the hosts. The effects of multiple parasitism on sex ratio and size of the parasite are discussed.

While conducting an extensive survey for parasites of mosquitoes during the fall of 1970, a number of damselfly naiads from one site was found containing mermithid nematodes. Since damselflies are predators of mosquitoes and since this is the first known record of a mermithid nematode parasitizing damselflies, subsequent collections and observations were made on this parasite and its effect on the host.

The adults of this mermithid were tentatively identified as a undescribed species of the genus *Amphimermis* Kaburaki and Immura by Dr. W. R. Nickle, Plant Science Research Division, Agricultural Research Service, U.S. Department of Agriculture, Plant Industry Station, Beltsville, Maryland. Species of *Amphimermis* have been found parasitizing the rice borer *Chilo simplex* Butler in Japan (Kaburaki and Immura 1932) and the bogong moth, *Agrotis infusa* (Boisd.) in Australia (Welch 1962). Welch (1962) considered *Complexomermis* and *Amphimermis* to be the same, gave priority to *Amphimermis*, and included 2 more species in the genus. One species was a parasite of orthopterans from Germany and the other was collected from forest floors in Russia (host unknown).

The presence of *Amphimermis* sp. in damselflies in southwestern Louisiana is the first record of this genus parasitizing North American insects, and as previously mentioned, is the first known record of a mermithid parasitizing damselflies. Artyukhovsky and Negrobov's (1967) report of the discovery of an undescribed mermithid in naiads of dragonflies in Usman, Russia is the only other known record of a mermithid nematode in Odonata.

The pond in which the infected naiads were found is semipermanent, about 25 ft in diameter, sometimes attaining a depth of 4 ft, and is in a wooded area exposed to direct sunlight. More than 100 infected naiads have now been collected from this pond with parasitism in individual collections ranging up to 81% Parasitism was usually less than 40% and appeared to decrease with the onset of cold weather. However, naiads containing *Amphimermis* sp. were still present in the pond during latter January.

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Fig. 1—A mermithid nematode of the genus *Amphimermis* coiled in the thorax and abdomen of a damselfly naiad.

The *Amphimermis* sp. was found in naiads of *Ischnura posita* (Hagen) and *Anomalagrion hastatum* (Say), while at least one species of damsel fly and several species of dragonflies were found to be parasite free. The life cycle of this nematode appears to be similar to that of other aquatic mermithids and is completed within the pond. This parasite appears to be self limiting in distribution since it kills the host in the naiadal stage, and a survey of nearby ponds failed to reveal infected damsel flies.

Infected naiads possessed from 1 to 12 nematodes and emergence of the postparasitic juvenile nematode occurred first from hosts containing the greatest worm burdens. Also, the number of nematodes per host appeared to influence the sex of the emerging nematodes. Singly infected naiads produced predominantly female nematodes and no host contained more than 1 female. Hosts with 2 or more nematodes produced 79% or more males, and hosts containing 7 or more mermithids produced all males.

Similar observations have been made with other mermithids (Christie, 1939, Parenti 1965, and Petersen 1971).

As the nematodes matured they oriented themselves longitudinally in the abdominal and thoracic regions of the host and could be readily seen with the naked eye during the late stages of parasitic development (Fig. 1). The nematodes emerged from the hosts in the region of the anus and this escape did not always immediately kill the host. Some hosts lived several hours, and many with multiple infections, lived several days permitting the periodic escape of the parasites. One host produced four nematodes (1 female on the first day, 1 male on the second, and 2 males on the third) and survived for 4 days after the emergence of the first nematode.

The largest postparasitic female and male measured were 49 and 34 mm, respectively. Smaller postparasitic nematodes resulted from multiple infections, especially the males. Juvenile females were about 39 mm long in hosts with 1 and 2 parasites and averaged 32 mm in hosts with 3 nematodes. The only male obtained from singly infected hosts measured 34 mm; the average length was 22 mm for male nematodes from hosts with dual infections and averaged 11—12 mm for males from hosts with 5 or more parasites.

The length of the life cycle of *Amphimermis* sp. has not been worked out. However, based on its observed growth in the laboratory and the length of time required for it to molt to the adult stage (about 15 days), completion of the life cycle appears to require about 7-8 weeks during the summer.

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