

## Status and Future of Entomogenous Nematodes: Symposium Introduction<sup>1</sup>

J. J. Petersen<sup>2</sup>

The Society of nematologists is strongly oriented toward plant parasitic nematodes because of the economic impact of these parasites. However, a small but significant portion of the Society is involved in research on entomogenous nematodes; i.e., nematodes associated, usually parasitically, with insects. This group of nematodes has received increased attention in recent years because of a need to find new and better methods for the control of pest insects. This symposium attempts to bring together the current status of our knowledge about entomogenous nematodes and to focus on future prospects for the use of these nematodes in integrated pest management systems.

Poinar (5) listed 19 families of nematodes containing members that are facultative or obligative parasites of insects. Nine families (Allantonematidae, Diplogasteridae, Heterorhabditidae, Mermithidae, Neotylenchidae, Rhabditidae, Sphaerulariidae, Steinernematidae, and Tetradonematidae) include species that attack insects considered pests of man, killing, sterilizing, or altering host development, and have been sufficiently studied to demonstrate their potential as possible biocontrol agents (6). This introduction only highlights these groups; a detailed discussion of nematodes as biological control agents is given by Poinar (6).

The Diplogasteridae is a large family of nematodes, many of which have a phoretic relationship (where the insect serves only as a means of transportation for the nematode) with their host. However, at least five described species have been shown to cause

disease in insects by entering and reproducing within the body cavity of the host. Studies on the biocontrol potential of these species has been limited and, with the exception of restricted releases of *Pristionchus uniformis*, work has not progressed to the experimental release stage (3).

The rhabditids are generally free living; however, many have phoretic relationships with their hosts and a few are able to live within the intestines or reproductive systems of insects. No significant work has been done with this group, but some of its members may have control potential because they can be readily grown on artificial media.

Members of the Sphaerulariidae are obligate parasites restricted to a single family of hosts (Sciaridae). These nematodes are capable of killing or sterilizing the host. However, only one species, *Tripilus sciarae*, has been experimentally released. This release was successful in reducing populations of sciarid flies in a greenhouse (4).

The family Heterorhabditidae is represented by the single genus, *Heterorhabditis*, all species of which are facultative parasites of insects. Several species show promise as biocontrol agents, and laboratory studies have been encouraging. To date, field releases have not been attempted with members of this group.

The Tetradonematidae is a family of five species of obligate parasites which generally kill their hosts. Although members of this group have promise as biocontrol agents, their host specificity seems to be restricted to insects of little or no economic importance, thus greatly limiting their usefulness.

Members of the Allantonematidae are obligate parasites of insects but are ineffective as natural control agents. Many cause little damage to the insect host and those

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<sup>2</sup>Livestock Insects Research Unit, USDA SEA AR, Department of Entomology, University of Nebraska, Lincoln, NE 68583.

that cause extensive damage to the host are usually difficult to maintain in the laboratory. One of the more promising parasites of this family, *Heterotylenchus autumnalis*, readily sterilizes the face fly, an economically important pest of livestock. At least one field release of this parasite has successively been attempted (1). Also, at least three species of *Howardula* exhibit usefulness in controlling their respective hosts (the mushroom phorid, *Megasalia hallerata*, and *Carpophilus* and *Diabrotica* beetles), but little progress has been made in demonstrating their potential.

Species of the Neotylechidae that parasitize insects possess two possible life cycles, one free living feeding on fungi and one parasitic in insects. Several *Deladenus* sp. are effective insect parasites but only *D. siricidicola* has been extensively studied and successfully released for the control of wood wasps.

With the exception of the work by Bedding (2) on *Deladenus*, much of the significant research on entomogenous nematodes has been associated with Steinernematidae

and Mermithidae. These two families have been extensively studied in recent years. This symposium will address the current research and future status of the more promising members of these two families.

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