

Biological Control of Insects with Entomopathogenic Nematodes

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ABSTRACT

Entomopathogenic nematodes are obligate parasites of insects and the infective juveniles (IJs) are attracted to their hosts. On encountering an insect, IJs enter its mouth, anus, or spiracles, penetrate gut or tracheal walls, and release symbiotic bacteria into the insect hemocoel. This causes septicemia, followed by death of the insect within a few days, and the nematodes reproduce within the cadaver. The usefulness of entomopathogenic nematodes for the control of insect pests depends on their symbiotic associations with bacteria and other ecological (soil temperature, moisture, etc.) and behavioral characteristics (host finding, persistence, etc.).

We have demonstrated that different nematode species and isolates collected from the Pacific Northwest provide different levels of insect control. For example, *Heterorhabditis marelatus*, a new species from the Oregon coast, is more efficacious against root weevils and the Colorado potato beetle than *H. bacteriophora*. *H. marelatus* also is as effective against the cranberry girdler and mint root borer (both pyralids) as *Steinernema carpocapsae*. *S. feltiae* shows higher efficacy against sciarid mushroom flies than other *Steinernema* or *Heterorhabditis* spp. *S. riobris* provides excellent control of European crane fly larvae compared with other *Heterorhabditis* or *Steinernema* species or isolates. Effective control of insects among the different nematode species and isolates may be related to environmental conditions and insect host-nematode-symbiotic bacteria interactions.