

The value of entomopathogenic nematodes in lawn pest control

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The recently enacted ban on cosmetic pesticide use in Ontario has lawn care specialists wondering which biopesticides offer the best results and are a safe alternative.

Entomopathogenic nematodes are an effective alternative to conventional insecticides. Now, more than ever, these nematodes are gaining acceptance and use as an important tool in controlling turfgrass insect pests.

“Entomopathogenic nematodes are remarkably versatile in being useful against many soil and cryptic insect pests in diverse cropping systems, yet are clearly underutilized,” states Randy Gaugler, department of entomology at Rutgers University.



Nematodes are simple, microscopic roundworms—colourless, unsegmented and lacking appendages.

Certain plant parasitic nematodes are associated with crop damage.

These harmful organisms include cyst, sting, lance and root knot nematodes. The beneficial nematodes, Entomopathogenic, have proven highly effective in controlling insect pests and reducing the

damage they can cause. Entomopathogenic nematodes belong to the Steinernema and Heterorabditis nematode families.

Beneficial nematodes attack larvae by entering their natural body openings. Once inside, they release symbiotic bacteria that quickly kill the insect. Reproduction inside the insect releases a new generation of hungry, infective juveniles which disperse in search of further prey.

What makes these nematodes useful as a bio-insecticide is that applications are safe for the environment. There is no need for protective masks or safety equipment. While they are lethal to insect pests, they have no harmful effect on plants or animals. Groundwater contamination and pollution are not concerns.

In addition, nematodes can be applied with standard agrochemical equipment and sprayers, and kill the target insect within 24 to 48 hours.

Additional benefits of using nematodes include:

- Quickly controls pest larvae at the time of application
- Controls the problem before it appears
- No re-entry restrictions
- No pest resistance problems
- Natural product that is safe to users, consumers and the environment
- Compatible with other biological/IPM systems
- Non-toxic with no requirement for protective clothing
- No disposal restrictions

Choosing the appropriate nematode product for a specific target pest is crucial, as each species carries different bacteria, uses different hunting tactics and has different temperature activity ranges. Several different strains of beneficial nematodes are currently marketed for controlling insect pests in the turf industry:

- Steinernema carpocapsae searches out, enters and controls Armyworm, Billbug, Sod Webworm, Annual Bluegrass Weevil, Cutworms, Fleas, Cinch Bugs
- Brands: Millenium, BioNem C, Guardian, NemAttack

- *Steinernema feltiae* controls Leatherjacket

Brand names: Nemasys, Gnat Patrol

- *Heterorhabditis bacteriophora* is effective against European Chafer Grub, Oriental Beetle Grub, Masked Chafer Grub, Japanese Beetle Grub and Black Vine Weevil

Brand names: Nemasys G, NemaSeek

- *Steinernema scapterisci* targets Mole Crickets

Brand names: Nematac S

A study completed by the British Columbia Ministry of Agriculture, Food and Fisheries showed that *H. bacteriophora* was the most effective non-chemical product for control of second-instar European Chafer larvae, causing 100 per cent chafer mortality relative to the control, only 48 hours after treatment.

Just like any other pest control, the implementation of nematodes requires users to be knowledgeable about how to use them effectively.

As you are considering the use of beneficial nematodes in your operation, keep these five tips in mind:

1. Take the tool box approach. Think of beneficial nematodes as another tool in your integrated pest management tool box. When used along with beneficial insects, crop scouting and other cultural practices, beneficial nematodes provide another valuable tool for controlling crop pests.
2. Buy quality and know what you are getting. Not all nematodes are created equally. Since nematodes are a living organism, they require special handling to ensure that they will be effective when applied. Be sure that the nematodes you purchase have been shipped and stored in a way that does this. Most nematode suppliers ship directly to the grower using next day or second day air freight along with ice packs to keep the nematodes cool. There are several quality manufacturers and marketers of nematodes in North America, many of whom are members of ANBP. For a listing of members see the ANBP website at [www.anbp.org](http://www.anbp.org).
3. Read and follow label directions. The formulation of nematodes varies from manufacturer to manufacturer. As a result, the mixing and handling instructions may differ, depending on the manufacturer. Be sure to read the directions for use provided with the nematodes. Pay special attention to the storage guidelines and expiration date information. Most nematodes need to be stored in refrigeration and cannot freeze. Detailed storage instructions should be provided by the supplier. Removal of screens from spray nozzles may also be recommended.
4. Know the pest's life cycle. While few of us are entomologists, having a good understanding of the life cycle of the pest being controlled is still needed. Nematodes are primarily effective on the insect's larva stage and not on adults. The nematode will enter the larvae and release a lethal bacterium. So being able to recognize and anticipate the life cycle of the pest will help you in timing the nematode application to maximize its effectiveness.
5. Resource the industry contacts. Since nematodes are very specific and selective in the pests they control, having the assistance and input of others knowledgeable in the use of nematodes will be helpful. Reach out to your industry contacts for further help and assistance. Some university researchers and extension professionals specialize in the study and use of nematodes. Other growers and producers may be able to provide information about their experiences in using nematodes. Your distributor sales representatives and the nematode manufacturer are also important resources to provide assistance and recommend the right nematode and rate to use in controlling the target pest.

By using these five easy steps, you can begin to use nematodes as a part of your integrated pest management program.

To learn more about these products, contact a reputable distributor of your choice. They can provide

detailed cost, use and application information.

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