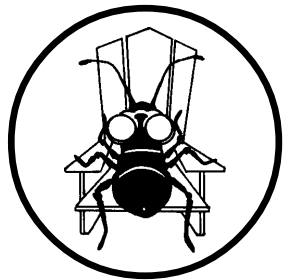


Moisture Effects on Entomopathogenic Nematodes



Pest Watch

It may be possible to take advantage of the nematodes' quiescent survival ability by applying them early in the season, and "activating" them with irrigation later in the season when an insect pest is present.

Entomopathogenic nematodes are well adapted to infect larval insect pests living in soil, and have the potential to be important biological control agents in turfgrass. In the mid 1980's, several species of entomopathogenic nematodes became commercially available for insect pest management. Initially, small-scale production and limited marketing resulted in these products being used mainly for home gardens, lawns and landscapes. More recently, a few large companies have attempted mainstream marketing aimed at the commercial turf, vegetable, and fruit industries, but acceptance has been hindered by variability in the success of the nematodes' ability to control target insects.

More consistent results have been achieved by educating users on better application techniques and appropriate selection of nematode species and strains for particular uses. However, the impact of the agronomic environment on nematode ecology must be better understood before nematodes can be a reliable pest management alternative. Our work examines the effects of soil moisture on entomopathogenic nematode infectivity, under both laboratory and field conditions.

Our studies indicated that HB nematodes tolerated dry soils and very moist soil better than SG nematodes. HB rebounded to higher levels of infectivity after rehydration and remained infective longer than SG. These results have many practical implications. Growers/managers can

better determine if nematode applications will be effective in specific field situations if they know more about tolerable soil moisture conditions for nematodes. They can also manage irrigation to stay within these limits. It may also be possible to take advantage of the nematodes' quiescent survival ability by applying nematodes early in the season, and "activating" them with irrigation later in the season when an insect pest is present. Home lawns infested with scarab grubs could be an ideal system for exploring this concept.

In the future, we would like to investigate nematode mechanisms of infectivity including the role of quiescence and mobility. This would include comparisons of nematode species and the effect of many soil physical factors. Information gained would be used to better select nematodes for specific field applications and possibly for selecting and breeding nematodes with desirable traits. Close comparison of laboratory soils and in-situ field soils will also be necessary. Eventually we hope to be able to evaluate field soil/sites for suitability to nematode applications.

The nematode species used in any studies mentioned, and reasons for their selection are described below.

Steinernema carpocapsae (SC). More is known about this species than any other

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Pest Watch

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entomopathogenic nematode. SC is easy to produce in both in vivo and in vitro cultures, and it is the most widely available commercial nematode. SC is representative of classic “ambush” or “sit and wait” host-finding strategy, and can infect several insect orders, especially lepidoptera and some coleoptera. Therefore, it is an important standard for comparison in nematode testing.

***Heterorhabditis bacteriophora* (HB).** HB has also been well studied, though not as extensively as SC. These nematodes are relatively easy to produce in vivo, and are commercially available. HB exhibits a “searching” or “hunting” host-finding strategy, and can infect several insect orders. They are especially effective against some scarab grubs, including the Japanese beetle.

***Steinernema feltiae* (SF).** Much less is known about this nematode species, but it is commercially available on a limited basis. The few field tests of SF against scarab grubs have yielded mixed results.

***Steinernema glaseri* (SG).** This nematode is not currently available on a commercial basis, but is known to be a strong “searcher” and an aggressive grub pathogen.

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Short Cutts

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multi-use fields, and developing communication skills for dealing with coaches and administrators.

The Long Island Short Course will complete the three year commitment made in partnership with the NSLGA. The 1999 course is scheduled for February 15 through 26. Following this effort, discussions will continue regarding how the Cornell Turfgrass Program in partnership with the County Associations and industry leaders best address the continuing education needs of the region.

As you can see, exciting times lie ahead as your Cornell Turfgrass Program prepares to enter the next century with a “full head of steam”. If you have any questions about the short course, contact our Director, Joann Gruttadaurio at (607) 255-1792.

Human Resource Update

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want you to listen more carefully, write things down if necessary and ask questions if anything is not clear.”

Note that the first part of this statement used an “I” message where you state how you feel using the word “I” so that the other person does not feel offended by what you say. It doesn’t blame “YOU” — the other person. Table 1 compares “YOU” and “I” messages.

Feedback

In studies where employees have been asked about their performance, the most common response is, “I must be doing well because I haven’t heard that I’m doing anything wrong.” This response implicitly suggests that feedback is very limited and that the expectation is that feedback will be negative. Both are mostly true and neither is conducive to good communication and high productivity.

First, feedback should be common and should be based on performance. Remember, in his book, *Everyone’s a COACH*, Don Shula states, “Good performance should be treated differently than poor performance.” When we give feedback, it should respond to:

- positive consequence
- a need for redirection; performance stopped and redirected using training
- a negative consequence; requires a reprimand, a punishment, a demotion, removal from activity.

The following are ideas for improving our feedback-giving activities:

- Ken Blanchard says, “Catch your employees doing something right.”
- Give four compliments for every constructive criticism.
- From Jane Magruder Watkins of Transformational Management, “Practice Appreciative Inquiry: the process of asking questions about what is going well, rather than what is going poorly.”
- Use the PIN technique to find positive aspects of performance even when you must say “no”:
 - focus on **P**ositive aspects
 - focus on what is **I**nteresting and innovative
 - focus on what is **N**egative.

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