

BENEFICIAL NEMATODES: TINY GRUB HUNTERS OF THE SOIL

Got grubs? Spring 2002 turned out to be one of the worst years yet for white grub infestations and the following lawn devastation. Many gardeners and homeowners were looking for advice as to how to put their lawn back together and fend off the next wave of grub attack. While Japanese beetle grubs are definitely part of the problem, European chafer grubs caused much of the havoc. These grubs are bigger, feed more and for a longer time, and are harder to control than Japanese beetles. Most homeowners resort to an insecticide treatment, but some wish for an alternative approach.

Imagine a tiny nematode coming to the rescue. What, pray tell, is a nematode? Nematodes are microscopic, eel-like creatures with pointy heads. There are many species of nematodes – some can actually damage plants, but others are called “beneficial nematodes” since they aid gardeners and farmers by killing destructive insect pests. The ways in which nematodes hunt and live are truly examples of truth being stranger than fiction. A nematode will swim through the moisture clinging to the grains of soil, looking for a host. It enters the victim through the mouth, anus or spiracles (breathing vents). Once inside, the nematode releases bacteria, which through their multiplication produce toxins that rapidly kill the host but leave the nematode alive. The nematode then feeds on the bacteria/host tissues and reproduces, spawning several thousand new nematodes. This next generation may be ready in as little as ten days to find another host and complete another cycle. If there aren't enough hosts around, however, the young nematodes will probably starve.

In general, beneficial nematodes must be purchased through mail-order businesses that rear them under laboratory conditions. This makes getting nematodes when you need them a little more complicated than running down to the garden center or hardware store. They must be alive when applied, usually in a stream of water. Rates may differ, but billions are usually used per acre. The two nematodes most often suggested for controlling grubs in lawns have multi-syllabic scientific names: *Steinernema glaseri* (commonly called “S. g.”) and *Heterorhabditis bacteriophora* (“H. b.”).

While that all sounds a bit complicated, there are further difficulties using beneficial nematodes. Sometimes they arrive from the lab where they were raised or from the store in poor health or dead. If the soil is not moist, or soil conditions are otherwise unfavorable, they may fail. Pesticide residues in the sprayer or delivery system may kill them. Ultra-violet light may harm them, too, so they need to be applied in the evening. There are probably dozens of other factors that we do not understand at this time which keep the nematodes from their peak performance.

Results from using nematodes in research trials and “real life” experiences range from dismal failures to shining successes. Dr. Dave Shetlar from The Ohio State University published data a few years ago showing that in nine tests using “S. g.” at a rate of 1 billion per acre, average control was only 48.8%, with the individual tests ranging from 0 to 81% control. With the H. b. nematodes at the same application rate, control in seven tests averaged 43.8%, with a range of 0 to 84%. Using 2 billion H. b. nematodes per acre, average control went up to 67.8%, with a range of 52 to 84%; however, data from only two tests was included here. Note that experienced researchers are often able to achieve good results using nematodes (sometimes well over 90%), but it doubtful that most homeowners and gardeners can do the same, especially in their first application, since they probably have little scientific training. Therefore, at this time, Cornell Cooperative Extension does not “officially” include beneficial nematodes in its publications. We still have questions from interested gardeners, and below are listed some suppliers who have in the past offered beneficial nematodes for sale (call early to check for the latest information).

IPM Laboratories: (315) 497-2063
Gardens Alive: (812) 537-8650
Hydro-Gardens: (800) 634-6362
M & R Durango: (800) 526-4075
North Country Organics:(802) 222-4277

Scientists, including some at Cornell, are working diligently to improve the success of beneficial nematodes in controlling white grubs. Hopefully, more research will pave the way to improving the performance of these tiny hunters of the soil.

6/2003 Written by David Chinery, Cornell Cooperative Extension of Rensselaer County
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