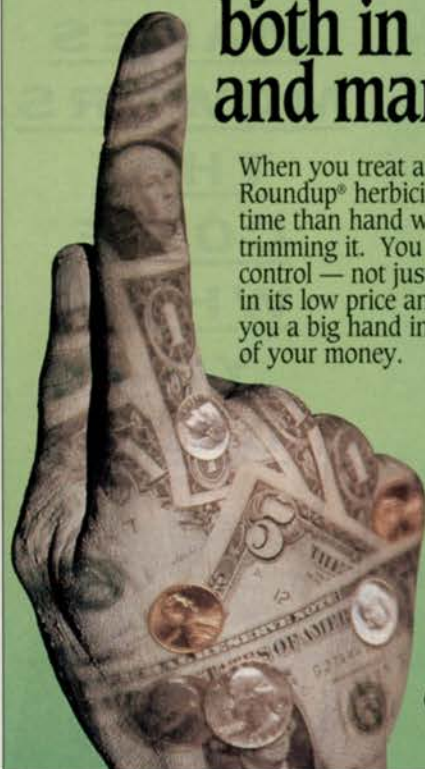


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Study shows nematodes safe for beneficial insects

Studies suggest the nematodes are selective when dining out.

By James E. Guyette

■ Using nematodes on lawns will not harm beneficial insects, according to a recent study at Ohio State University.

The tiny roundworms—officially called entomopathogenic nematodes—kill bluegrass billbug larvae, cutworms and sod webworms and are marginally effective against Japanese beetle larvae, which are all common turf pests, says Dr. David J. Shetlar, assistant professor of entomology at OSU. But earthworms, predatory beetles, mites and other beneficial insects are seemingly immune. "These nematodes appear to be selective assassins," says Shetlar.

A lot of the selectivity has to do with the natural habitats of the organisms found in lawns. "Most of the beneficial insects do not really live in the soil where the nematodes are moving around," Shetlar explains.

Clearing a hurdle—The study is among the first to measure the impact of nematodes on non-target organisms, according to Shetlar. He notes that the results are an important vindication for nematodes as a biological pest control.

"It's the first biological alternative that has efficacy that we can recommend," says Shetlar.

New techniques in nematode production have brought down the costs to be more in line with other control agents. "They're able to produce trillions of nematodes a day rather than billions of nematodes a day," he explains, adding that the cost to apply one billion nematodes per acre—the recommended rate—is about \$70.

Nematodes are also becoming available for use on warm season grasses. "There's several nematode types that are being developed for Southern lawns," he reports. Nematodes are especially effective in controlling fleas and mole crickets. "Mole crickets sort of take over the grubs (as a main pest) in Southern lawns," Shetlar says.

It is especially important to discover that nematodes are indeed selective when it comes to which organisms are targeted.

"In the lab, nematodes kill any insect they can get into. In the field, there was concern that they would be no different than an insecticide that kills everything. Thankfully, that's not the case. People who are looking for a selective, non-chemical treatment can use these nematodes," Shetlar says.

Entomopathogenic nematodes kill insects not as parasites, but as agents of disease. A nematode larva enters the insect just as a parasite does. But rather than feeding directly on the insect, it regurgi-



Shetlar: Nematodes most effective in mid-June.

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larvae. Untreated plots had about 80 bugs per square meter; treated plots had only about 14.

- Nematodes run out of steam pretty quickly. At two weeks after the initial treatment, two-thirds of the "guinea pig" waxworm larvae were infected; at seven weeks, fewer than one-third were infected. "This result means it's important to apply the nematodes when the billbug larvae are feeding in the soil near the turf crowns, usually in mid-June," Shetlar says.

- Most importantly, nematodes appear ineffective against beneficial garden predators and decomposers. Study results show no significant differences between treated and untreated turf in numbers of earthworms, mites, spiders centipedes, millipedes and beetles.

"Within a month after the nematode application, populations of non-target organisms were pretty well normal," Shetlar reports.

"In terms of non-target insects, we were most concerned with above-ground beetles and rove beetles," Shetlar notes. "They're probably the No. 1 predator of cutworm eggs and sod webworm eggs. According to our results, entomopathogenic nematodes should not harm these populations."

Shetlar says that nematodes can present a convenient, economical and environmentally friendly method of turf pest control. For best results, a mid-June application (in Ohio, local weather conditions may vary) is advised. "The best results occur when the lawn is moist from recent rains or just after a watering," Shetlar points out. "I also recommend a generous watering immediately after applying the nematodes."

—The author is a freelance writer based in Cleveland, Ohio.

tates a packet of bacteria, spewing it into the insect's body cavity. The bacteria causes rapid infection, paralyzing and killing the insect within 48 hours.

When the insect is dead, the nematode sets up shop in the carcass, feeding on bacteria and growing to maturity. If both a male and female are present in the same insect carcass, they mate, creating a new generation of infective youngsters. When the food runs out, these larvae leave the original insect and look for others to infiltrate and kill.

For the OSU study, Shetlar and his colleagues, technician Kevin Power and entomologist Dr. Harry Niemczyk, selected three bluegrass/ryegrass turf sites in Northern Ohio—among them Niemczyk's home lawn. Each site was divided in two; one half got the nematode treatment, the other half did not.

Sub-surface placement—The researchers applied the nematodes in mid-June using a sub-surface applicator. This device, a Rainsaver Jr., slit the turf every three inches and injected nematodes to a depth of about one inch. The injection unit was important because it protected the nematodes from damaging rays from the sun, Shetlar says.

To gauge the effect of nematodes on centipedes, spiders, mites and non-target insects, the researchers took soil cores from all sites—treated and untreated—every 10 days. They measured the effect of nematodes on their actual targets, billbugs and sod webworms, by sampling and counting the number of pests in the nematode-treated sites as opposed to the non-treated sites.

The results:

- Nematodes are particularly effective against bluegrass billbug

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