Golfdom'S PRACTICAL RESEARCH DIGEST FOR TURF MANAGERS

TURFGRASS TRENDS

NEMATODE CONTROL

The Changing Landscape of Nematode Management

If nematode problems are becoming more prevalent, why is the problem increasing and how do we deal with it?

By Nathaniel Mitkowski

As most superintendents with perennial nematodes issues recall, Nemacur (fenamiphos) has been out of the national distribution chains for about a year. As the only registered turfgrass nematicide (aside from Curfew), the product filled an important niche in turfgrass management. While occasional failures of the product have been reported in past years throughout the South, it was almost universally effective in the northern regions of the United States. Those superintendents who have a supply of Nemacur in their shed are using it sparingly, typically spot-treating infested areas and managing with a mind towards IPM like never before.

In fact, while I still use the same damage thresholds that I have used in previous years, the recommendation to apply Nemacur has never been harder or required more careful deliberation. After all, once a superintendent exhausts the supply he or she has on hand, there is nothing yet available to replace it.

For those superintendents without a supply of Nemacur, last year was especially difficult. In the ten years I have been counting nematodes at the University of Rhode Island, I have never regularly observed counts as high as those I have seen in the past two to three years.

Years ago, as an undergraduate doing counts at the University of Massachusetts, I vividly remember counting a sample with almost 9,000 spiral nematodes per 100 cc soil. In the two years I regularly worked in the nematode lab as a student, I never again saw a count that high. Last summer, such a count would not be unusually high at all. In fact, I regularly saw nematode counts in the 6,000 to 10,000 range from both stunt and spiral populations.

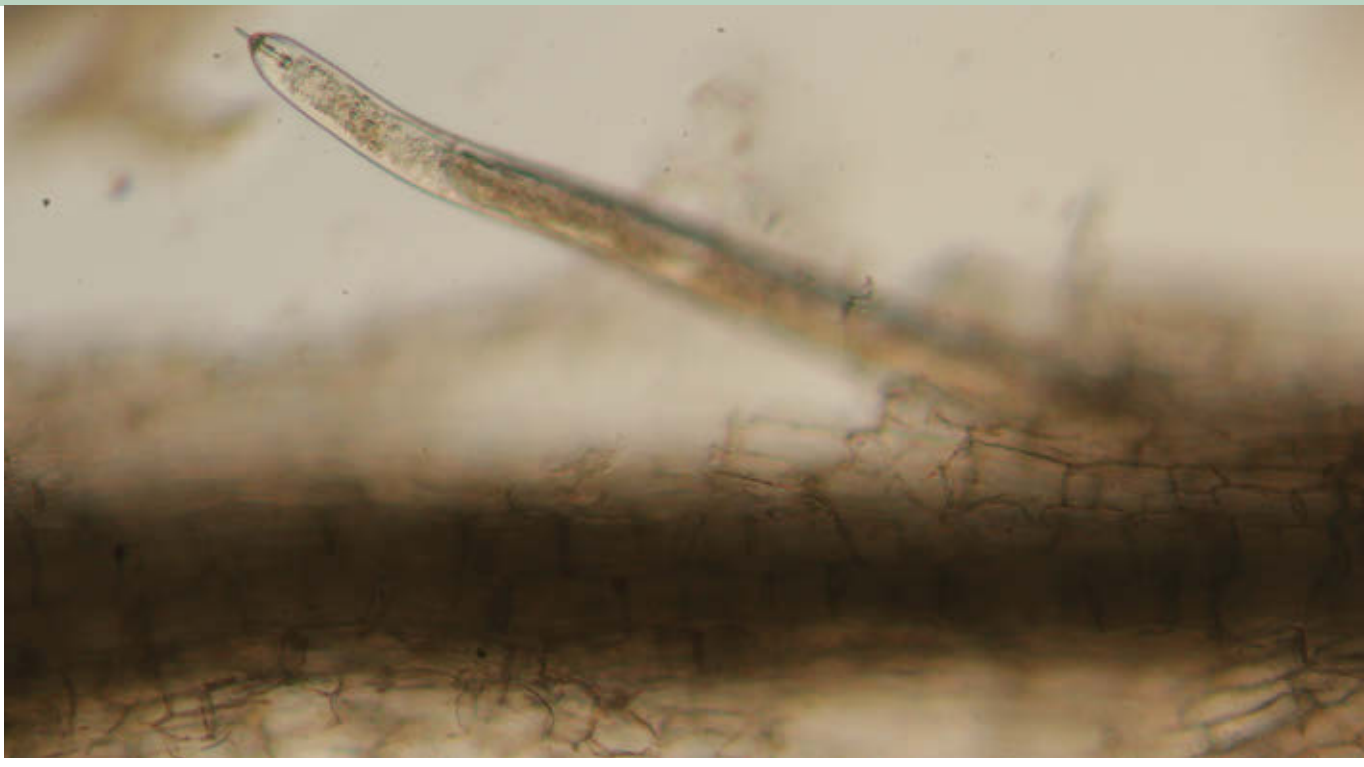
Despite the recent observations of higher nematode populations in the Northeast, it is unclear whether populations are truly increasing. The data to support this claim is scant and based primarily on diagnostic evidence, which has a tendency to be greatly skewed.

For example, in a diagnostic capacity I generally see materials from a small

Continued on page 44

IN THIS ISSUE

OUR SPONSORS



Another challenge for superintendents is handling nematodes with fewer materials in their arsenal. Here, a lance nematode pops out of a root.

PHOTO COURTESY: NATHANIEL MITKOWSKI

Continued from page 43

sample of golf courses. And golf courses that have fewer observed disease issues usually send fewer samples than those golf courses that have significant damage and decline. This means that a disease lab is often only seeing diseased turf and could easily assume that there was no healthy turf around! Another factor that may contribute to the perceived increase in nematode populations is the absence of Nemacur.

In the past, a course may have applied the chemical and requested a nematode count without informing the lab that Nemacur had been applied. If a nematode population appeared low when a count was made, I would have concluded that nematodes were not an issue. In addition, we do more nematode counts now than ever before because more superintendents request nematode diagnosis than in the past.

So while it is possible that nematode problems are increasing on golf courses, especially in the Northeast, this claim would probably not stand up to scientific scrutiny. It is entirely possible that populations are no higher than they have been in the past but our awareness of nematode populations is much greater.

If we assume that nematode problems are becoming more prevalent, there are two questions that need to be answered: why is the problem increasing and how do we deal with it? Neither question has an easy answer but there are a few plausible reasons for why nematodes issues may be becoming more prevalent.

As mentioned previously, it may be that superintendents are simply more aware of the problem and are looking for causes of decline that have eluded them in the past. Others may also point to global warming as an explanation. While this theory does have some merit, it does not fully address the issue of management changes in the past 20 years. And without a doubt, things have changed dramatically on golf courses in the past few decades: height-of-cut has steadily declined, traffic has increased, topdressing is far more frequent and the type of chemicals we currently apply are very different from those used in the past.

While all of these can play a role in the level of nematode damage observed on turf and how aggressive nematodes may ultimately become, the change in the types of chemicals used by managers holds particular importance. Many of the pesticides now applied to turf are more environmentally friendly than those used in the past. However, it may be that some of the non-target effects of older pesticides actually kept nematode populations to lower levels. While mercury used to

be commonly applied on golf courses, this practice has long been discontinued. It was demonstrated in the 1950s that when mercury was applied to the soil, plant-parasitic nematode populations dropped dramatically.

Research from the 1960s demonstrated that mercury does not leach much when applied in pesticide form. Thus, it could be inferred that mercury was slowing nematode population growth in those locations in which it had previously been applied. However, the application of 20 years of topdressing has likely buried most residual mercury three to four inches below the surface of the soil where it will have little effect on nematodes today.

A few years ago the EPA added restrictions to the use of thiophanate-methyl. Many superintendents have moved away from the product in light of rate restrictions and are substituting strobilurin fungicides in its place under certain circumstances.

Thiophanate-methyl (and benomyl — which was marketed as Tersan 1991 before its registration was withdrawn) breaks down into carbamates and has been shown to be effective against some nematodes in experimental trials.

The registration for Dursban (chlorpyrifos) has also recently been withdrawn. This insecticide is an organophosphate and may have had some activity against nematodes when applied at higher rates. Even if these products did not directly kill nematodes, they very likely could have slowed reproduction and interfered with feeding behavior. Despite the fact that non-target effects against nematodes exist, none of those mentioned above were registered for nematode control nor should they have been (or currently be) used to manage nematode populations. But it is possible that the use of these products had side effects which are only now being recognized.

Cultural practices also have a major role in nematode related damage. It is relatively uncommon to observe nematode damage on fairways and roughs in the Northeast. Although populations can become high in these locations, the plants tend to root much more deeply and experience far less traffic. While deeper rooting can often increase nematode populations, plants gain a tremendous benefit in nematode tolerance that far outweighs the increase in nematode populations (especially with stunt and spiral nematodes). The continual drive to lower heights on putting greens may well be increasing the impact of nematode populations that were tolerable at higher heights of cut.

So what options are available to control nematodes in the absence of Nemacur? Not many. Curfew does work well and is available but is not registered for most northern states, is expensive and requires special applicators to do the work.

In the past 10 years there has been a spate of products to hit the market and while some look promising in replicated trials, others don't seem to do much. We recently ran a small trial at the University of Rhode Island but won't really know how well the products worked until we replicate the study this summer.

Dr. Billy Crow at the University of Florida has demonstrated some positive results with the chemical methionine (an amino acid) but only on bermudagrass and only against sting and ring nematodes, neither of which are a problem in the Northeast. But new nematicides continue to be developed and researchers throughout the country continue to examine them for efficacy and phytotoxicity.

Despite the lack of chemical approaches to controlling nematodes, I have seen a number of golf courses that have been able to minimize plant damage by focusing on plant health. Specifically, these courses have made significant efforts to grow roots and minimize stress. In addition to fertilizer management and cultural practices, these courses have also worked hard to control root diseases like Pythium and summer patch.

These techniques will not reduce the number of nematodes present on a putting green but they will allow grass to more successfully tolerate nematode damage and recover from this damage more quickly. Unfortunately, the trade off for healthy grass may sometimes be slower speeds and this is a compromise many courses are unwilling to make.

Nematode counts in the 6,000 to 10,000 range from both stunt and spiral populations are common.

Nathaniel Mitkowski, Ph.D. is an associate professor of plant pathology in the University of Rhode Island's Department of Plant Sciences in Kingston. He can be reached at mitkowski@uri.edu.