



GreenSolutionsUpdate

Best Management Practices for Nematode Control with Indemnify® in the Northern United States

Nematodes have been known to attack cool-season greens in the north since the 1960's. With the increased demands for fast green speeds, reduced inputs and stress on greens, nematode damage is becoming more common on greens in the cool-season region. Damage varies widely with nematode species, geography, expectations, and microenvironment, so the decision to treat must be made on a case-by-case basis for each golf course and potentially each green.

Symptoms

Symptoms of nematode feeding vary widely based on species of nematode(s), size of the population, weather, and stress on the turf stand. Symptoms can range from very diffuse and almost unnoticeable injury to intense damage. Symptoms are usually localized to portions of usually a few greens on northern courses and can include:

- Yellowing or thinning in 4-6" diameter patches which may enlarge to several feet in diameter
- Limited rooting depth
- Limited or lack of response to fertilization, irrigation, and pesticides
- Increased need for hand-watering
- Increased susceptibility to stress-related diseases such as and Pythium root rot, and overall poor turf health in isolated areas

Symptoms can often be minimized by insuring all root-infecting pathogens are controlled, decreasing stress on the turf and increasing inputs on problem areas, but these may not be successful long-term in spite of increased costs. If nematode damage is suspected, the first step is to sample for nematodes.

Sampling for Nematodes

Nematode populations fluctuate month to month and follow root growth dynamics, with higher populations coinciding with maximum rooting in spring and fall. If nematode damage is suspected, follow these guidelines:

- Take samples from 3-6" just outside the healthy perimeter of damaged areas.
- For comparison, take additional samples from healthy areas on the same green or other healthy greens.
- A soil sampling probe is most effective, taking 20-30 cores from around the damaged area, no more than 3-4" deep with healthy roots or 1-2" deep if roots are shallow. Repeat on the healthy area for the comparison sample.
- One or two cup-cutter samples from suspected and healthy areas will also work, but may not be as accurate as using a soil sampling probe. Cup-cutter plugs are not the preferred sampling method.
- Handle with care to keep cores intact, do not remove thatch or mat, and combine in a labeled zip-lock plastic bag to maintain necessary moisture
- Avoid extreme temperatures (sunlight/heat) and promptly place the samples in an air conditioned room or refrigerator, but do not freeze
- Send to diagnostic lab using next-day delivery, insuring samples arrive by mid-week to minimize chances of samples perishing if not delivered and analyzed promptly.

Interpreting the Nematode Test Report

The diagnostic lab report will list the population of each nematode species in each sample, usually as a number per 100 cc of soil. In addition, the report will most likely state whether the populations are considered to be damaging. However, established thresholds vary widely from lab to lab and state to state and will likely not take into account the expectations and stress on individual greens. Therefore, lab reports should help guide the decision to treat or not, but rarely dictate that decision.

Curative Applications of Indemnify®

Apply Indemnify at 0.39 fl oz/1000 sq ft as soon as the diagnostic lab confirms that symptoms are in part due to plant parasitic nematodes. Water-in with no more than 1/8" of water within 24 hours. No additional fungicides, wetting agents, or aerification before/or after application are required. Current recommendations suggest a single application of Indemnify could likely provide season-long control on northern greens. Resample for nematodes 4 weeks after application and continue monitoring throughout the season at monthly intervals to best understanding of fluctuating nematode populations. A second application Consider making a second application of Indemnify may be needed in late-fall or early in the spring to keep nematode populations in check if samples show increased nematode numbers.

Preventative Nematode Control

On courses with a history of nematodes, it is important to monitor populations to determine if preventative applications of Indemnify are justified. The best time to sample is late spring to early summer. Using a soil probe, take 20-30 samples per green at a 3-4" depth following a zig-zag pattern across each green (Derek's Figure). Follow the rest of the sampling procedure as detailed earlier.

If lab reports show nematode populations near or above threshold levels, consider an application of Indemnify in the spring. Indemnify should be applied at 0.39 fl oz/1000 sq ft when the average soil temperature is 60-65°F at a 2" depth for five consecutive days. Water-in with no more than 1/8" of water within 24 hours. No additional fungicides, wetting agents, or aerification before/or after are required. One application of Indemnify at 0.39 fl oz/1000 sq ft in the spring will likely provide adequate control for most courses. A second application 2-4 weeks after the first will enhance season-long control on courses with a low tolerance for nematode damage. Regardless of how many applications are made in the spring, consider sampling for nematodes periodically throughout the season to determine if any additional Indemnify applications are warranted in the fall.



Severe nematode damage in a transition zone creeping bentgrass/annual bluegrass putting green amplified by excess heat and rain in mid-summer (Zac Reicher, Bayer).



Ring nematode damage in a creeping bentgrass/annual bluegrass putting green amplified by additional stress (deep tine aerification) (Rob Golembiewski, Bayer).