Athletic-Field Dyes for Winter Color

Examining Pythium Root Dysfunction in NC

Building a Golf Green at CPCC

Nematode Assay… an Important Turf Tool
The NC Department of Agriculture and Consumer Services' nematode assay laboratory is one of the state's best-kept secrets. It offers a very affordable testing service that is especially useful for managing high-value plantings, such as golf courses, parks and athletic fields. The NCDA&CS laboratory screens for 45 species of plant-parasitic nematodes and usually posts test results online within five to ten working days. These results are invaluable in troubleshooting problems and selecting cost-effective solutions.
Although many types of nematodes feed on turfgrasses (Figure 1), the species most likely to cause economic damage to turf are ring, stubby root, root knot, sting and lance. Even though nematodes are common and widespread pests, the NCDA&CS lab receives most of its samples from a few select counties (Figure 2). The Agronomic Division would like to see more samples coming in from all over the state.

Turfgrass managers are urged to consider the benefits of nematode assay. Testing costs only $3 for each in-state sample. For this minimal fee, the turfgrass manager receives useful data on the identity and hazards of existing nematode populations and recommendations for effective management strategies. Nematode assay is really the only way to make an informed decision about whether expensive chemical treatment is really worthwhile.

Types of nematode assays
NCDA&CS assays can be either predictive or diagnostic. Most samples from established turf are submitted for diagnostic purposes. This means that the assay is being used to help troubleshoot a problem and to determine whether nematodes have a role in it. Oftentimes, however, nematode assays are a last resort, and by the time samples are taken, significant time and money have already been invested in water, fertilizer or pesticides in an attempt to address the undiagnosed problem. Judicious use of predictive assays has the potential to head off nematode problems and minimize costly remedial measures.

Predictive (routine) assays have two primary uses. First, they are good insurance before establishing areas of fine turf. They indicate the need for nematode control while it is easiest to carry out — before planting. Predictive assays should be conducted on native soil before planting, on sod before purchase and on any amendments (sand, topsoil, organic matter, etc.) before establishment.

Illustration by Vanya Mullinax.
Figure 1. Nematodes identified in soil samples from turfgrass (1999-2006). **These nematodes are most likely to cause economic damage.
etc.) before incorporation. Nematode problems may eventually appear, but it’s a good strategy to delay them as long as possible.

The other, and perhaps the most promising, use of predictive assays is to map out and monitor nematode populations in established turf. Background information on the species, location and numbers of nematodes present is an invaluable management tool. It provides an inside look at population trends and alerts turf managers so they can plan a timely and effective treatment strategy. That’s definitely better than finding out in the heat of the summer and at the peak of the recreational activity that a serious nematode problem needs chemical treatment.

**Using predictive assays to monitor nematodes — a proactive strategy**

Timing is not an issue for routine (predictive) preplant samples and problem (diagnostic) samples, which are taken before planting and whenever a problem presents itself, respectively. Sampling for monitoring purposes, however, requires some forethought and planning.

**Establish a baseline.**
To begin with, collect samples from all greens at monthly intervals over the course of an entire growing season. This methodical approach will indicate if damaging nematode species are present and where. Potential problem areas can then be targeted for closer scrutiny. Where problems are not indicated, nematodes can be ruled out as a contributing factor to any decline that shows up reasonably soon thereafter.

**Be nematode savvy.**
Nematode populations rise and fall at certain times of the year. Some species are harmful; others are not. What is not likely to change, however, is the species composition. Once there, the same combination of species is likely to be present on a given green indefinitely. Since sting and stubby root nematodes cause the most damage to turf in North Carolina, they are the most important ones to keep track of.

Know when and where to treat.
Nematode populations are highest in bentgrass greens in June/July and again in November/December. They tend to peak in greens overseeded with bermudagrass.
Figure 2. Most nematodes assay samples that the NCDA&CS Agronomic Division laboratory receives for turf come from only a few specific countries.

Figure 3. Use this sampling pattern to collect soil cores for predictive (routine) nematode assay.

Figure 4. Use this sampling pattern to collect soil cores for diagnostic (problem) nematode assay.
in late summer and fall. Therefore, late summer or fall samples will be excellent indicators of potential problems and the need for treatment.

Late-summer sampling has an additional factor of timing in its favor. If chemical treatment is recommended, a fall application can be particularly effective in killing sting nematode adults and reducing eggs for overwintering. If fall treatment is not possible, it can be delayed until spring. However, it should be taken care of before early June. If not, rising nematode populations will increase the tendency toward drought stress, disease and decline during the summer months when treatment is least effective and most disruptive.

**Collecting and handling samples**

Accurate nematode assay results depend on quality samples. NCDA&CS regional agronomists are available to make site visits and give advice on establishing a sampling program. In general, however, the Agronomic Division recommends these guidelines.

- Use boxes, bags and information sheets designed specifically for nematode assays. They are available free of charge from the Agronomic Division office in Raleigh, NCDA&CS regional agronomists, county Cooperative Extension offices and some ag-supply dealers.
- Collect samples only when the soil is in good working condition. It should not be frozen or excessively wet or dry.
- Collect at least 20 cores with a soil-sampling probe from each unique location. If soils vary in the sampled area, take a separate sample for each soil type. Cores from established turf should be about 4” deep. Mix the cores together to make one composite sample.
green light
ON BASICS
continued

• Follow the appropriate sampling pattern for the type of assay you desire. For predictive assays, collect soil cores randomly throughout each area (Figure 3). When trying to diagnose a problem, collect cores from the edge of an affected area, avoiding spots where grass is already dead (Figure 4).

• When troubleshooting a problem, collect pairs of samples from “bad” areas and nearby “good” areas. In addition, collect soil samples for nutrient analysis from both areas, according to standard soil sampling procedures. Having both sets of data provides better insight into the nature of the problem.

• For each sample, fill a plastic sample bag, seal it tightly and place it in the nematode assay sample box. Print your name, address and sample identifier in the spaces provided on the box.

• Protect boxed samples from temperature extremes. Do not place them in direct sunlight, the trunk of a car or a freezer. Plan to ship them within 24 hours, preferably not over a weekend or an extended holiday.
• Fill out the appropriate nematode sample information sheet completely: form AD-3 for routine (predictive) samples and form AD-5 for problem (diagnostic) samples.

• Carefully package samples, information sheets and the appropriate fee in a sturdy box. Nematode assays cost $3 per sample for North Carolina businesses or residents; the fee for out-of-state samples is $10.

• Ship via carrier, such as UPS, FedEx or DHL, or take them yourself directly to the Agronomic Division laboratory in Raleigh. Do not send samples via the U.S. mail.

Receiving the nematode assay report
Assay results for in-state samples are usually available on the NCDA&CS Agronomic Division’s Web site within five to ten working days after samples arrive at the lab. Currently, results for out-of-state samples cannot be posted online, but that may change in the near future. In the meantime, out-of-state customers should request that their reports be emailed to them or wait to receive them in the mail. NCDA&CS nematode assay reports list the types of nematodes extracted from the sample, an estimate of population levels, an assessment of potential hazard and management advice.

Contacting the NCDA&CS Agronomic Division
Information on collecting or submitting samples for nematode assay is available online at the NCDA&CS Agronomic Division Website: www.ncagr.com/agronomi/

For additional help, call the division office at (919) 733-2655, or contact the NCDA&CS regional agronomist assigned to your county. A list of regional agronomists and their service areas can be found at www.ncagr.com/agronomi/rahome.htm.