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Nematode Sampling

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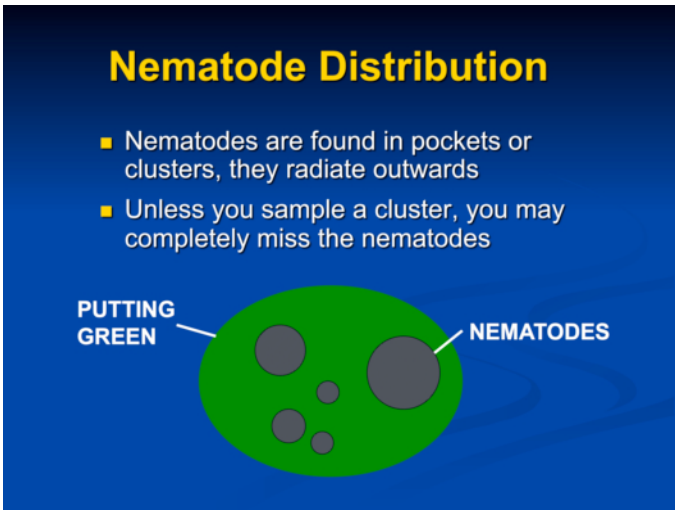
As of November 28, 2008, Nemacur (fenamiphos) can no longer be sold in the United States (use of Nemacur according to its previous label is *legal* until all supplies have been exhausted). This date represents an extension of the original May 2008 deadline. Since the 1960's, Nemacur has been the premiere pesticide for post-plant nematode control on turf. As an organophosphate, fenamiphos is both highly effective but also very toxic to mammals, birds and other wildlife. Despite this significant drawback, careful and judicious use of Nemacur has been shown to safely and effectively reduce nematode populations in turf.

Figure 1. Nematode populations increase dramatically during the summer months. Populations typically peak in August, when plant roots are at their weakest.

With the loss of this extremely important tool, golf course superintendents have few options for nematode control. While a number of organic and alternative products have been formulated and used to manage nematodes on turf, few have demonstrated substantial effectiveness. However, new products are constantly reaching the marketplace and independent testing continues.

The question that arises now is, "should I test for nematodes"? With few satisfactory options for nematode control after November, does it matter? Some have opted for the approach that ignorance is bliss. If you can't control the nematodes anyway, why bother to count them? The problem with this argument is that the nematodes don't realize that Nemacur is no longer available. On putting greens where nematodes are going to cause damage, the nematodes will be causing damage whether you know it or not and whether you can control it or not.



The advantage to knowing that damaged turf is the result of nematode predation is that you can: 1. *take cultural steps to mitigate the damage,* 2. *you can stop needlessly spraying fungicides to try and control a problem that is nematode related,* 3. *you can blame something other than yourself for the damage on your greens.*

Although #3 may not make your greens committee happy, the fact is that nematode problems seem to be as capricious as the weather. We have no idea why nematode problems are worse on some greens than on others and we don't know

why they are worse in some years than in others. No superintendent ever gave himself turf-parasitic nematodes and no superintendent can ever permanently get rid of the ones he has, whether he or she has many or just a few.

Some cultural practices that can be employed to mitigate nematode damage were listed in our September 2006 Newsletter, but the most significant step to lessening nematode damage is to increase turf rooting depth. The easiest way to increase rooting depth is to increase height-of-cut. Obviously, most superintendents try to avoid sacrificing speed unless absolutely necessary. Unfortunately, nematodes can be just the necessity that requires a higher height-of-cut. Nematodes are not a problem on fairways, roughs or lawns. The simple reason for this is that these surfaces have enough root mass to cope with nematode damage. Putting greens, especially older greens and *Poa* greens, often have very few roots by August (just when the nematode populations are at full strength).

Sampling for nematodes is not a trivial matter. Although nematode counts can be made from a cup-cutter plug, there are limitations to this technique. The counts derived from a cup-cutter plug can only tell you about the nematodes in the 28 squares inches in that cup-cutter plug. If you have a small area suffering from damage caused by an unknown pathogen, this may be useful. If, however, you want to know how high the nematode populations are across 5,000 square feet of a putting green, a composite sample must be taken.

Composite samples are composed of 15-20 individual ½" or 1" cores taken from across a putting green and then combined into a single bag. When the nematodes are counted from this type of sample, all the soil in the bag is homogenized and a very reliable average of the number of nematodes across an entire green can be determined.

In order to get a good count, sampling procedure is critical. The nematode numbers arrived at for a putting green are only as good as the sample from which those numbers are derived.

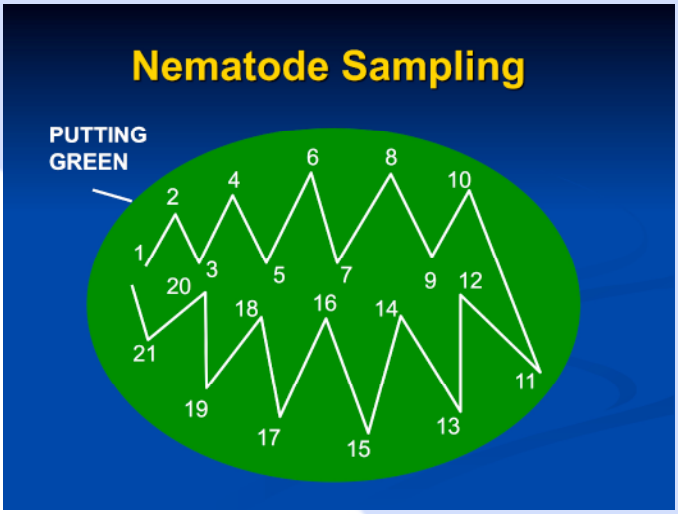


Figure 3. When doing "whole-green" average counts, nematode samples should be taken from the entire green. Sampling should be done in a zig-zag pattern to cover as much of the green as possible. Each number in the above figure represents an individual 1" core.

Under no circumstances should a "random" sample be taken. Any sample should be systematic, covering as much of a green as possible with as even a distribution as possible. Because the number of plugs being combined is small (less than 20), full coverage of the green is critical. Because nematode populations are random and clustered, using a random sample can easily miss large pockets of nematodes. The figure above shows a good systemic "zig-zag" sample and will produce reliable nematode counts. Although taking more than 20 plugs can increase reliability, it generally increases labor to an unreasonable degree with only a small increase on the accuracy of nematode counts.

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