



Old Pest - New Problem?

By **Oscar Peterson**, Golf Course Superintendent, Watertown Country Club

Like many golf courses this season, we had a tough one at Watertown Country Club. We experienced winterkill damage on about 20% of our putting surfaces, along with some damage on fairways. We had moderate success with regrassing on our problem greens, while the fairways returned to normal very quickly. This most likely had more to do with play and traffic than our efforts or the weather. Because of this we struggled to keep the conditions on our putting surfaces that were provided in 2004. By the end of June, we had replaced all of the weak areas on the problem greens with hex-plugs from our nursery. I wouldn't say that things were perfect at this time, but they were showing great improvements.

On Monday, July 18th the grounds crew fertilized the greens and didn't mow them to provide a rest after a strenuous Member-Guest weekend. They performed better than even I expected, and the members and their guests were pleased. Conditions still looked fine at this point. By Thursday, July 21st clipping harvest had increased as expected and the greens were quite lush. On Saturday, July 23rd I noticed some declining areas of turf on five of my greens. Of these greens, number seven was the most troublesome to me as it was one of our healthiest greens last year. In response, I raised the mowing heights to lessen the pressure on the plants. The next week brought some relief with milder day and nighttime temperatures, plus less humidity and even a little rainfall. In addition, I aerified most of my greens with some small solid tines

and skipped mowing one day. Surprisingly enough, five of my greens didn't respond to any of the relief and in fact their health continued to decline. All of the other greens appreciated the respite.

The symptoms on these problem greens started as chlorosis, thinning and dieback of the grass blades. They did not respond to aeration, fertility, fungicides or water. The roots were shallower than other plants and the plants in general looked stunted. Symptoms occurred in irregular areas and started to enlarge. The areas started to bare as time went on. Another observation that I made was the healthy hex-plugs that we moved declined severely two weeks to a month after they were planted. The nursery they were moved from is much newer (less than ten years old) and has a very healthy stand of bentgrass.

I have dealt with my share of sick turf in my career. I have learned one lesson from all of these experiences; find out what went wrong and if possible, do not let it happen again. A majority of Watertown Country

Club's greens were pushed up and grassed in 1926. They have been modified slightly with straight sand topdressing. As you can imagine a majority of the grasses on my putting surfaces are annual blue-grasses. In my experience this grass can make it through even tough summers in Wisconsin if you keep it on a preventative fungicide program throughout July and August.

I was sure my scheduling and rates were fine. With no other indicators of problems, I took some samples to the Turfgrass Diagnostic Lab in Madison on Monday, August 1st, just to make sure I didn't miss anything. After hours of contemplation over my turf books, I also dropped some samples off to a nematologist at the UW-Madison to have an assay done, just to rule it out as a possibility.

The next day I received word that the pathologists at the TDL were unable to isolate any pathogens on any of the samples I brought in. They were so troubled by my samples that they came out and did some percolation tests on my greens (kudos to Guenwha Jung, Steve Abler, and Paul Koch

ARMOR
ACCESS BOXES™
 FORMERLY AMETEK® ACCESS BOXES
 Manufactured in
 Sheboygan, Wisconsin
 Specify **ARMOR ACCESS BOXES™**
 – A Wisconsin Product!



for their efforts and interest). On Friday August 5th I received word back from the nematologist. Strangely enough Watertown Country Club had excessive levels of what are commonly called stunt nematodes. Our levels were 1700-2100 (nemas/100 cm³ soil). The published damage threshold that is somewhere between at 100-350 (nemas/100 cm³ soil). (1), (2). When comparing numbers it is important to compare the units as there is some data published in nemas per liter which isn't half as bad as nemas per quart.

I remember looking at a nematode through a microscope in my college plant pathology class and spending part of a lab talking about them, but I dismissed most of this information as trivial when I heard it was uncommon to have problems with them on turf in Wisconsin. So here is a basic refresher course for those of you who did the same.

Nematodes are one of the more abundant forms of life on the planet. They are microscopic worms, which live off of decaying matter, insects, mammals plants, and even turfgrass. Plant parasitic nematodes are obligate parasites (need living cells to live) that are capable of over-wintering. In fact, the eggs of some can be dormant for years and hatch under the right conditions or when a host moves near. They are mobile; however, one foot in a year is about as far as they can travel. They are always present but normally in levels that the turf can tolerate and sustain. It is common to have nematode problems on Bermudagrass greens in the far south, but it is unusual to have a case of nematodes that can cause noticeable damage on turfgrass in the Midwest. (1)

This is why I was so shocked to find high levels on my greens at Watertown Country Club. "All of the literature indicates that symptoms may be indicative but are not diagnostic of nematode problems. Nematode damage varies considerably with environmental conditions and is easily confused with insect injury, other diseases, nutrient and moisture stresses, pesticide injury, thick thatch, compaction, or other turfgrass problems. Nematode infested roots commonly are shallow, coarse (lack of fine feeder root), bushy, or stubby. Suspect a nematode problem if the turf does not respond normally to applications of fertilizer, water, a fungicide or to increased aeration in compacted or heavy soils. Symptoms of root injury vary depending on the species and number of nematodes and the other stresses that are involved." (2)

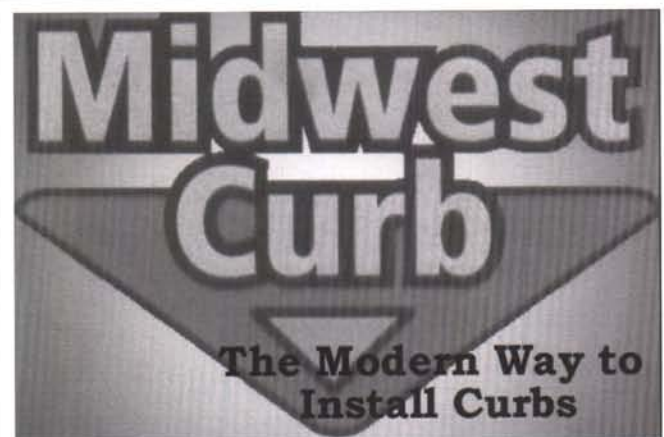
If the symptoms arise I recommend taking the sample and sending it to the lab; the test is very conclusive. Let the lab take the guesswork out of the equation.

The samples are relatively easy to take, though recommendations differ slightly. I used my smallest soil probe (1/2" diameter) and took samples from random

spots on the surface that I wanted tested. Each sample was to 4" and I tore off the top grass/thatch layer. Also I did not sample from the middle of my affected areas as the food source would be lacking in the areas and the nematodes would be also. You want to collect 100 cubic centimeters of soil. This is pretty much the standard in the nematode industry.

For all of us not in the nematode industry (which is probably everyone reading this article) it is about a half cup of soil. Put it in a Ziploc bag and send to: Department Of Plant Pathology, C/O Dr. Ann MacGuidwin Department, Russell Laboratories, 1630 Linden Drive, Madison Wisconsin 53706-1598. They recommend keeping it out of direct sunlight. I made the mistake of driving it there myself and battled traffic, parking and worst of all construction; I actually spent a block driving on the sidewalk. One assay costs \$22 to perform.

According to UW-Madison's nematologist Dr. Ann MacGuidwin, the strange spring and warm summer weather helped nematodes complete their lifecycle faster than normal and created the problem. Also our soil type and specific microclimate on these greens have enabled it to happen. She said this year she saw more samples from crops that do not usually have problems and even more problems on crops with a problematic history. She has had troubles satisfying my questions about why this was a problem at my course this summer. Her best reply was to equate it to the disease triangle. The conditions happened to be perfect on my course this season. Also, since we are talking about population dynamics, this population has probably been festering for years. The symptoms became visible this season because of the combination



Specializing in:
Parking Lots - Cart Paths - Green Protection

262-363-2281
midwestcurb.com

of higher populations and the turf's decreased ability to sustain any parasites.

Damage thresholds are extremely complex and difficult to establish: they vary with the form of nematode, type of soil, season of the year, species, growth stage and vigor of the plant, and cultural practices. Moreover, nematodes almost always exist in communities of more than one species. One, several, or all of the species present may be contributing to the damage. Population thresholds for damage to turfgrasses are not well defined and are based largely upon personal experience rather than research. General thresholds for damage to turfgrasses differ widely among nematodes. For example, spiral, ring and pin nematodes cause little detectable damage until populations increase to very high levels, whereas dagger, lesion and lance may cause damage at relatively low population levels. Combinations of nematodes, especially lance, lesion, stunt, and dagger may cause problems at below damage threshold levels. (2)

The trade name of the chemical recommended to me to control this issue is Nematicur. It is a restricted use pesticide, and the only one legal and labeled for this purpose in Wisconsin. The closest supply was located in Florida. It took ten days to arrive. None of my salesman had experience applying this product in our climate on bentgrass / annual bluegrass greens. Not having any firsthand experience with this problem or solution, I was quite wary of the whole process. I took the pictures on the 12th of August. I applied Nematicur Monday, Aug 15th at dusk and watered it in with 0.5" immediately. I took the follow-up pictures one week later on Monday night, the 22nd. I tried to stay in the same areas of the first pictures. If I had to do it again I would have painted dots (those

researchers do use some common sense sometimes).

This was not a scientific experiment. I fertilized not too long after the application. Changes in weather also played a factor in recovery. All of that being said, recovery was quick. I was reluctant to say so the day I took pictures until one of my part-time employees said he noticed improvement since he had seen them last. I guess contemplating it everyday will do that to you. They continued to improve on a daily basis. I had recovery in areas I hadn't had grass on in six months. All of the chlorosis faded and clipping harvest was been better than

all year. I have included pictures; however, they don't compare to seeing the damage and the subsequent improvement firsthand.

Nematicur doesn't sterilize the soil; it is not a fumigant. It is an organophosphate, just like Dylox or Talistar. This product doesn't work instantly. The concentrations are such that the plant takes it up and the nematode ingests it when it is feeding. Paralysis sets in and then the worm starves. The longevity of this product is up to 12 weeks and it can travel to a depth of 10 inches. This is necessary because nematodes have been found in drainage water from USGA specification putting greens



Stunted grass.



Pea green grass is recovering.



Triplex ring area was affected.



Recovery even on the triplex ring.



Close up of damage on 7 green.



Close up of recovery on 7 green.



More damage on 7 green.



More recovery on 7 green.



Full view of damage on 7 green. Notice, not just in triplex ring.



Close up of recovery.

so they are capable of traveling deeper than that in the soil. (3) The populations didn't go to zero, and they will most certainly rebound. However, I am very hopeful that they will not rise to damaging levels again.

The organophosphates are really the only products left that control nematodes. According to Dr. Ann MacGuidwin, she has had success with organic fertilizers lowering nematode populations in agriculture; but she doubted that we could accomplish the same things with our cultivation practices on mature putting greens. The fertilizer has to make it to the same spot in the soil as the nematode and the concentrations have to be fairly high (In the magnitude of 2lbs of N/m). This is of importance because there is much speculation that Nemacur will not be re-registered for turf when it is due.

My plans for the upcoming 2006 season include sending in samples for nematode testing in May. And that will be the only test that I will take in Russell Labs on the UW-Madison campus that I hope I get a zero on.

References:

- (1) Couch, Huston B. 1995 Diseases of Turfgrasses 3rd edition Pgs. 217-239
- (2) University of Illinois Extension 2000. Report on Plant Disease Rpd # 1108, October 2000. Department of Crop Sciences University of Illinois at Urbana-Champaign. Nematode Parasites on Turfgrass.
- (3) B.B. Weterdahl, M.A. Harivandi, and L.R. Costello 2005. Biology and Management of Nematodes on Turfgrass in Northern California. USGA Green Section Record September-October 2005 Volume 43, Number 5 pgs. 7-10.