Summertime Disease Observations

By Dr. Gayle L. Worf
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Rhizoctonia — have you seen any of it? We've had very few days of really warm nights so far, which is good news for controlling both Rhizoctonia and Pythium. (This is being written in late July.) Reports of these diseases to date have been very light. And while we've gotten the fungus to grow from our inoculations both with *R. solani* (the brown patch fungus) and *R. zeae* (the sheath and leaf spot fungus) over the surface of Tom Harrison's Maple Bluff nursery turf where we're trying to compare fungicide efficacy on these two different Rhizoctonia diseases, we haven't seen any actual damage from it yet.

But some Rhizoctonia has occurred around Wisconsin. Under conditions like this summer, the symptoms can be much more subtle, and not produce the distinct patches that we normally associate with the disease. Instead, the disease tends to "run" under the upper leaves, killing lower parts and creating a generally thinned out appearance. So if you've had some areas that fit that description, look closely. You may have Rhizoc! While the affected leaves turn red or brown, you should also look for irregular blotches or spots on at least a few otherwise healthy appearing blades of grass.

Also, don't be surprised if it affects one species of grass while leaving another one in your mix totally unaffected. *Poa trivialis* is often first affected, for example. Ryegrass is also more susceptible than some other grasses. We have a summer patch plot with Randy Smith and Chuck Frazier at Nakoma. No summer patch yet, but the bentgrass pockets in some nontreated areas within the plot are showing symptoms like we described above. The Poa is unaffected. So no, it's not true — Poa is *not* more susceptible to brown patch than bentgrass. It depends upon the strain of the fungus!

Controlling Pythium — Pennsylvania State University results. We mentioned Pythium. I haven't seen any this season. But some have asked about the use of tank mixes of fungicides, as described in Penn State tests. I talked with Pat Saunders about it. She has found that using one-third of the high label rate of Aliette (e.g., one-third of eight ounces) with one-third the low rates of each of Subdue and Banol (one-third of two and four ounces, respectively) has given excellent results under severe disease pressure, probably for two to three weeks, and without likelihood of encountering fungicide resistance problems.

That might be a good recipe to try during seasons with sustained Pythium pressure. But during a year like this one, where outbreaks are shortlived, you probably would also be happy with the old contact products like chloroneb (Terraneb) or ethazole (Koban or Terrazole).

A return of some missing diseases. Red thread/pink patch has been vicious in our red fescue variety plots at Yahara this summer. This is after an absence during the dry hot seasons of the last two years. It's also doing some damage in the ryegrass, and to a lesser extent, in the bluegrass varieties. It had become a disease of considerable concern during several years prior to 1988. So far it hasn't shown up yet in our red fescue fungicide trials, though. I hope it does. It's nearby, and we've spread some diseased clippings to encourage it. We really need to find an effective treatment for red thread. For us, we've not had much success with anything since Actidione disappeared, but some of the newer fungicides probably would do the job.

Necrotic ring spot is also appearing modestly in our bluegrass variety transplant study, the first time since it was established four years ago. We've also had a few calls and the diagnostic laboratory has processed a few samples. So NRS is back again, perhaps not as severe as we experienced it during the previous decade. Probably the important key is the cool wet spring we had.

Some of the disease responses we've been discussing should be on display at the WTA Field Day at Yahara Hills.

BLANKETS

By Monroe S. Miller

I wrote an article in the May/June 1990 issue of *THE GRASS ROOTS* about covering putting greens for the winter with synthetic blankets. I'm not exactly opposed to them, but rather feel topdressing offers many of the same advantages plus a few others.

That article inspired the question of this issue's SURVEY because I was curious about what really was going to be happening this fall as winter approached. Basically, I wanted to know how widespread the use of synthetic covers was going to be on Wisconsin golf courses.

Here's what I asked 32 WGCSA members at either the Mid Valle Golf Course meeting in June or the Rock River Country Club meeting in July:

1. Are you going to cover any of your golf course putting greens with synthetic blankets this upcoming winter?

2. If yes, how many greens will you cover?

3. If yes, what brand of blanket will you use?

The results are as follows:

1. YES — 13; NO — 19

2. Two were covering only one green (usually a problem green, in terms of winter survival). One WGCSA member will cover three greens, another will blanket six greens, a third man will cover nine of his greens and one golf course will have 10 greens under synthetic cover. Three golf course superintendents plan to cover all 18 regulation greens on their courses. Three more will cover 19 greens, obviously including the practice or chipping green with the regulation greens. Finally, one golf course will be blanketing 40 greens for the winter of 1990/1991. Guess who has that many greens and that kind of money?!

3. Ten WGCSA members were using Evergreen covers and three were covering with Warrens' blanket.

As is usually the case, the comments were interesting. Many of those answering "NO" to the first question would like to be using the blankets, but simple economics prohibits it. Some feel like I do — "why not use topdressing?" Some plan to use blankets in the near future and figure to budget for one or two each year.

A couple of course managers felt that neither topdressing nor covers was necessary. Their attitude was "if you have the wrong kind of winter weather, nothing is going to help much."

One of our colleagues combines both procedures. He topdresses his greens and then covers them, at least selected ones, with a blanket.

He might be the smartest of all!

QUESTIONS FROM THE FLOOR

By Dr. Wayne R. Kussow
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Q: Given the great advances of biotechnology, especially by some of your colleagues in the CALS, UW-Madison, do you think we'll ever see N-fixing bacteria adapted to the turfgrass varieties we use on our golf courses? (SHEBOYGAN COUNTY)

A: My opinion is that this will not happen. You may have noticed that during the past year or two very little has been reported in the press regarding incorporation of N-fixing capability in the grasses. The basic problem is that biological N fixation can only occur in the total absence of oxygen. Nodules on legumes provide such an environment. No one has been successful in isolating an N-fixing microorganism that will infect and form nodules on grass roots.

Q: I learned a lot from your recent article in THE GRASS ROOTS *about "Best Management Practices for Turfgrass." Can you explain to me the difference between BMP and IPM (integrated pest management)? Or are they essentially the same thing? (MONROE COUNTY)*

A: Integrated pest management is a part of what is now known as "best management practices" (BMP's). The other part of BMP's is that which focuses on nutrition and cultural practices other than pests. Thus, BMP encompasses IPM.

Q: A sales representative who regularly calls on me is pushing hard to sell me a product high in manganese. He says it's an excellent material for adding green color to turfgrass (he calls it a "stain"). Is this legitimate? Is it phytotoxic? Could toxic levels build up in the root zone? How safe would you guess such a material to be? I have 25 years of experience in Wisconsin's golf turf industry; never before has anyone tried to sell me manganese. Any advice? (PORTAGE COUNTY)

A: To date, the only confirmed Mn deficiency on field-grown turfgrass that I'm aware of occurred in bermudagrass in Florida, growing on what was once a very acid sand but whose pH over five years had risen from 5.2 to over 7.0 because of the high calcium content of the irrigation water used. Florida researchers studied the problem and concluded that applications of manganese sulfate or chelate could correct the problem temporarily. Long-term correction of the deficiency was achieved only by applying ammonium sulfate to reduce soil pH.

These same researchers also cautioned against applying Mn to large areas. Rather, they recommended dissolving 0.4 oz. $MnSO_4$ in a gallon of water and spraying an area to the drip point (i.e., until drops form on the turfgrass and begin to run off the leaves). Response to the Mn will show up in a week or two **if the turf is Mn deficient.** Unless the turf was chlorotic to begin with, the only response you can expect is a faster growth rate.

I seriously doubt whether there is any Mn-deficient turf in Wisconsin. If one were to look for some, you'd want to seek out areas where the turf was established on highly acid (pH 5.0 or less) sandy soil and the pH subsequently adjusted to 7.0 or higher through liming or use of "hard" irrigation water. You would then look for turf in which the youngest leaves are chlorotic and the older leaves have yellow-green spots.

I'd venture to guess that the Mn rates being recommended for turfgrass will not cause phytotoxicity unless used for several seasons on turf with naturally high Mn levels. In general, this will be the case only where the turf is being grown on poorly-drained mineral soil.

Q: How likely is nitrogen used in golf course fertilization programs to enter groundwater supplies? (OZAUKEE COUNTY)

A: At current rates and frequencies of N applications on properly-managed golf courses, chances of groundwater contamination with harmful levels of nitrate are very remote. This is the conclusion recently drawn by several researchers who have studied the problem and reviewed all evidence currently available.

If leaching of nitrate were to be a problem, it would occur on sandy soils or sand-based putting greens treated with excessive rates of soluble-N fertilizer and over-watered. Researchers at the University of Massachusetts recently reported on their research on 80:20 sand:peat greens. When the greens were treated with 0.2 lb N on 7-day cycles or 0.4 lb on 14-day cycles and irrigated with 0.5 inch water three times per week, 46% of the water leached BUT total N leaching losses were less than 0.5% of the N applied. Under these conditions, fertilizer N leaching losses did not differ with the N source applied. When 1.0 lb N was applied all at once, fertilizer N leaching losses averaged 1.2% and leachate nitrate concentrations exceeded the drinking water standard of 10 ppm for the first four days following application of calcium nitrate and ammonium nitrate but not when urea, ammonium sulfate, UF, or IBDU were applied.

Anyone in the turf industry confronted by public concern over groundwater contamination with nitrate from fertilizer needs to point out several key things: (1) Unlike with field crops, the rates of N used are considerably less than those needed for maximum growth. Hence, turfgrass recoveries of fertilizer N are relatively high; (2) When soluble N enters the root zone of turf, the N disappears very quickly from soil solution. Research has shown that 60 to 80% of the soluble N is taken up by the grass and microorganisms within 48 hours after entry into the soil solution; (3) Unlike with most field crops, the N applied to turf is split up into several applications each season. Consequently, soil solution levels of nitrate remain relatively low and any water leaching beyond the root zone has only very low nitrate concentrations; and (4) Turf, because it is a "high-value crop", is often fertilized with

SRN. Slow-release N sources do not load up soil solution with nitrate such that extensive leaching can occur. For these reasons, turf is one of the most environmentally-sound crops that can be grown.

Q: Sometimes you feel like you cannot win. We have high pH conditions and have been using elemental sulfur to gradually lower (or at least stabilize) that 7.5+ number. Now, I read where a professor of agronomy at Ohio State is raising the flag on programs like mine. He says sands with high $CaCO_3$ content (and a subsequent high pH from 7.5 to 8.5) can create problems when sulfur is added to them. The sulfur dissolves the $CaCO_3$, allowing it to migrate down in the profile. The result is a caliche layer with a high pH. He says it's almost like cement. Should I quit using sulfur? Which is worse — a caliche layer or high root zone pH? (IOWA COUNTY)

A: Is your high pH the result of using a calcareous sand to begin with or the result of several years of irrigation with water high in calcium and magnesium? If the latter then you need not worry. You'll be long gone before the quantities of $CaCO_3$ required to form a caliche ($CaCO_3$) layer develops from irrigating with hard water. On the other hand, if the sand used during construction or for topdressing contains several percent of $CaCO_3$, the main prerequisite for caliche formation is in place. Whether or not or when formation of the layer will occur, I can't say. Literature does tell us though that caliche becomes hard and "almost like cement" only if allowed to dry. By definition, caliche is a soft, friable $CaCO_3$-dominated layer in soils of low rainfall regions. Indications are that soil must start out with a substantial $CaCO_3$ content and virtually no leaching must occur for many years before a caliche layer begins to develop.

I've not seen any evidence of formation of caliche layers in the putting greens I've examined. I have, however, found accumulations of iron oxides cementing sand grains together and starting to form physical barriers to turfgrass root development.

Q: I'm a dedicated Milorganite user and, quite frankly, have no intention of changing. But it seems more and more companies are "getting into" the organics. A colleague is quite happy with a product called "Sustane". Yet another used an organic (from poultry manure) and the material was disastrous — bad odor and even worse physical properties. Rumor has it that one of our major national plant food companies is developing a line of organics, too.

What do you think about all this? Is it just another bandwagon everybody is climbing aboard or is there merit to these kinds of products? Won't Milorganite always stand alone? (GREEN LAKE COUNTY)

A: Several forces are at work here. You have the public sector push toward use of "natural fertilizers" becoming the answer for some major disposal problems confronting the poultry industry and a few others with organic wastes. In the midst of this, considerable progress has been made the past few years in developing large-scale composting technology. Thus, all the ingredients

are present for a rapid influx of organic fertilizers.

Organic fertilizers, by their very nature, are low-analysis materials. Hence, unit nutrient costs are high — generally too high for extensive use by commercial agriculture. So where is the prime market? The turf industry. Where else could one sell nitrogen for as much as $2.00 or more per pound?

Each of the organics has its own unique characteristics. Sustane, for example, releases N to turfgrass faster than does Milorganite, but consequently has a shorter response time. All have their distinctive odors, some more tolerable than others. Some have excellent physical properties, while others do not. On the other hand, all the organics do have two things in common. Release of N from them requires microbial breakdown. For this reason, they are not good cold weather N sources. Second, one-half or more of the organic N present is very slow to be released. Consequently, turfgrass recovery of N from the organics generally lags behind materials such as urea, SCU, UF, IBDU, etc.

Call it a bandwagon if you will, but the organics are in the marketplace for very understandable reasons. Each has its own characteristics and none are miracle products. My guess is that fairly soon the market will approach saturation and some of these products will disappear. Those that remain are the ones with which turf managers have become familiar, know what to expect from a particular product, and have successfully integrated the product into their fertilization program.

Q: Probably the most radical piece of machinery introduced at the GCSAA show in Orlando last winter was Toro's Hydrojet aerifier. I was quite impressed by the machine, yet, something troubles me. We aerify turfed areas not only to relieve compaction, but to bring up soil that will mix with the thatch and provide biological control of that thatch. It seems to me that the Hydrojet is somewhat limited in its use because no soil is brought to the surface. What do you think, Dr. Kussow? (COLUMBIA COUNTY)

A: Reading a bit into your comments, I'll assume that your concern is about turfed areas that are aerified but not topdressed. Otherwise, I don't foresee a limitation.

The Hydrojet does lack the feature of bringing soil to the surface. Doing away with core removal was one of the guiding forces behind its development. Thus, in situations where mixing of soil with thatch is one of the desired outcomes of aeration, the Hydrojet is not the machine of choice.

OVERSEEDING GREENS

By Bill Keefe

Editor's Note: This article appeared in Volume 20, No. 3, Summer 1990 issue of "New Hampshire Turf Talk", official publication of the New Hampshire GCSA. Bill Zuraw is the editor, and he is the golf course superintendent at the Crump-N-Fox Club in Bernardston, Massachusetts. This is the second time a New Hampshire article has appeared in "THE GRASS ROOTS" "From Across the Country". It is reproduced here with Bill's permission. During the conversation we had while I was asking to use this, Bill mentioned how well a "THE GRASS ROOTS" piece was received in New England. He was referring to Dave Butz's article in "Shop Talk" that gave instructions on Maple Bluff's SAND PRO rake modification.

The article, written by Bill Keefe, tells of problems with "Poa annua" winter kill and subsequent overseedings of damaged areas. Bill was the golf course superintendent at the Brattleboro (Vermont) Country Club when the article was written. He is now the golf course superintendent at the Amherst (Massachusetts) Golf Club. Interestingly, Bill attended the two-year program at the Stockbridge School of Agriculture, University of Massachusetts, in Amherst.

Thanks to both Bills!

During the last three years at the Brattleboro Country Club, I have discovered various overseeding techniques which work and some which do not work.

Winterkill of *Poa annua* has left many golf course superintendents with no choice but to overseed. Faced with less than ideal putting conditions in early spring, members and club officials are anxious for superintendents to "get out there and **DO** something." Because there is always one club down the road somewhere which has overseeded its putting greens at the earliest possible opportunity, the pressure is on everybody to overseed, even if one's better judgment says "wait."

Early spring overseeding can be a cruel joke. Soil temperatures are too low. Greens are still too soft to support heavy equipment and intensive cultivation. Irrigations systems are not operating. Even if they are, trying to get greens dried out and at the same time watering new seed (which takes forever to germinate, if it germinates at all), is frustrating.

Seed will not germinate until soil temperatures are adequate. At Brattleboro, the greens with the most tree "protection" (shade) happen to be the greens with the most dead *Poa annua.* These are the greens where the need to overseed is the greatest, yet the seed response will not occur on these greens in early April. They are at least three weeks behind the healthy (sunny locations) greens, in terms of soil temperature and time of germination.

Two years ago, I overseeded three times in April. The first seeding in early April seemed a waste of time. The second in mid-April showed some germination, but mainly on the "better" or warmer greens. The final overseeding at the end of April finally resulted in germination on all putting greens.

Seeding greens three times was a waste of seed and labor. Keeping greens moist for such a long period encouraged the spread of the surviving *Poa annua* (and its seed) and promoted shallow rooted and weak turf.

Hot and windy weather in May put a lot of stress on the bentgrass just emerging from the final seeding. Frequent light watering during the day was necessary to ensure survival. One afternoon, seedlings watered at 12:30 p.m. were dead by the next scheduled watering at 3:00 p.m.

It takes several months for a bentgrass seed to become a mature plant capable of handling maximum summer or winter stress. Seed started in April is not ready for the stresses ahead.

The extra water and fertilizer needed to aid the establishment of the new seedlings further compounds the problems by producing succulent instead of hardy turf.

Preparation for a successful spring can begin in the fall. I firmly believe the August 15-Labor Day period is the ideal time to overseed greens in our area. Germination of bentgrass seed can occur in as little as three days. Soil temperatures are ideal. Morning dew is heavy. The sun is well past its solstice. Even though it is August, the sun is no stronger than it was in April.

Bentgrass seed is surprisingly hardy when planted at this time. Very little water is needed to ensure establishment, and the plants have sufficient time to mature and harden for winter survival.

At Brattleboro we do not have an overseeder. I have used a verticut and drop-seeded into the slits with good results. My experience is that the deeper and wider the slits, the better the results will be. But I prefer to overseed when aerifying. After aerification with a Ryan Greensaire with ½ tines (which make a ⅜" hole), the cores are removed and the topdressing is applied. Up to 10 Cushman topdresser loads or two yards of material is applied to each 4,000 to 5,000 square foot green. This leaves a layer of topdressing almost 1/16" thick.

The seed is then broadcast over the topdressing at a rate of one to two pounds per 1,000 square feet. Sand is the easiest material to work into the holes, although I do feel a topdressing mix containing some peat is a better topdressing material.

It takes a lot of effort to fill the aerifier holes. I use an upside down aluminum trap rake and work the material back and forth until it is gone. I do not think dragging the topdressing with a brush works as well, but brushing and thoroughly watering the greens afterward is helpful.

Mixing the seed and the topdressing in this manner results in the bentgrass seed being buried at a depth of anywhere from 2½" below the surface to right at the surface. I do not know which seeds survive and which do not. But the bentgrass seed's ability to survive when planted deeply may be underestimated.

The deeper the seed, the greater the protection from mower and traffic damage and from moisture stress. With this method, the bentgrass seed has never failed to emerge from the aerifier holes, although it is difficult to see the results

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Driving to be the *Very Best!*

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of overseeding a month after it is done. The following spring, however, the solid stands of *Poa annua* show healthy and mature bentgrass plants matching the pattern of the aerifier holes.

If there is a loss of *Poa annua,* the bentgrass can quickly fill in. The principal reason I like early fall seeding is that the plant is ready the following summer to survive extreme moisture stress. Irrigation and nitrogen levels can be adjusted to allow the bentgrass to dominate the *Poa annua.*

The final overseeding technique I would like to discuss is dormant overseeding. I feel it can be of tremendous value to golf course superintendents in northern New England.

For dormant seeding, I wait until there is no chance for germination in late fall — the month of November if the ground is frozen and there is no snow. If the soil needs to be worked or if you are aerifying or slicing and seeding, late October up until the ground freezes also works well.

Dormant seeding is truly a "no muss, no fuss" technique. In the spring the seed germinates when it is ready. Winter conditions ensure good seed/soil contact. There is no need for irrigation and no guesswork regarding soil temperatures.

Also eliminated is the struggle with the wet uncooperative soil conditions you get in the spring. For two years I dormanted seeded successfully in the roughs, but had not tried it on greens. Because my club had not allowed me to aerate and seed in the early fall because of tournaments, I tried dormant seeding on three greens with significant *Poa annua* populations. I also tried it on the collars. I used a ryegrass/bentgrass seed mix.

I aerified just before the ground froze, but did not topdress and seed until early December, just prior to snowfall.

An ice cover (for up to 120 days) and the lack of snow this past winter resulted in a lot of dead *Poa annua* throughout the golf course. At Brattleboro, the damage exceeded that of the previous two years. On the greens, the *Poa annua* emerged from the snow/ice cover looking good, but it died during the month of March.

At this time, germination from the overseeding had not begun. By early April the high, dry warm locations on the putting greens saw the bentgrass germinate. The ryegrass on the collars also germinated. The worst greens, especially in the valleys or the low spots showed no response. As I procrastinated as to what to do, more seed emerged.

I waited another week and more emerged. I waited some more and finally there was seed germinating from every aerifier hole on every green and collar which had been overseeded. I did not have to overseed at all this spring, despite the severity of the damage.

I have been amazed by the resiliency of the bentgrass on the greens and the ryegrass on the collars. The ryegrass did not require water at all, even when the temperatures approached 90 degrees in May for three consecutive days. I did hand water the bentgrass seed occasionally, just to be safe. There has been no problem with wilt. I did raise the height of cut on the greens which lost *Poa annua* to help in the establishment of the bentgrass, but have not applied additional water or fertilizer to push growth.

I have considered ryegrass use as an intermediate grass to be used in the transition on fairways, tees and collars as we move from Kentucky bluegrass/*Poa annua* to bentgrass and possibly fescue.

The ryegrasses — I have used many varieties — did not survive this past winter. In some areas, mostly the more moist areas, bentgrass is well established and reseeding hasn't been necessary. In higher, drier areas and in traffic areas, I will continue to use ryegrasses, but in conjunction with a fescue blend. For quick establishment and toughness, the ryegrasses cannot be matched. But in northern New England, both *Poa annua* and ryegrass will be susceptible to winter damage and more permanent grasses need to be used.

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