starting in May and continuing into July. Soon thereafter, new adult workers (all females) begin to emerge, after which moundbuilding activities dramatically escalate. Finally, as ant colonies begin to mature by late-summer and even into early-autumn (late-August - October), a sizable portion of the colony develops into winged reproductives (swarmers) consisting of new queens and drones. [Figure 2]

Once the colony reaches this stage, typically in the late afternoons on warm days, new queens and drones typically swarm by the thousands. This event is especially common after rains and thunderstorms. During this swarming process, the new queens and drones partake in a nuptial flight whereby they mate while flying. Soon thereafter, queens seek-out new locations

to build chambers. However, before constructing a new chamber, new queens chew off their wings. Oddly enough, most queens die before making a chamber; however, those that do survive typically construct a small chamber in the soil, often creating a small mound of soil approximately 3/8 - 1/2 inch in diameter. Surviving queens typically lay a relatively small number of eggs in the chamber. Within several weeks (< six), new worker ants (typically about 1/2 the size of normal workers) break open the chamber to forage for food. At this point, colony activity ceases as winter weather prevails. For the colonies that endure and survive the winter, they typically resume activity in the spring as temperatures are favorable and food sources become available.

Based on previous research findings, it is widely understood that each nest has only one queen, thus the future of the colony is dependent on her. This is not to downplay the importance of workers, they too serve a crucial role by both defending (protecting) and foraging for food for the colony. As far as the types of foods that ant species feed on, respective ant species have various or different food preferences. Lasius ants appear to like foods that contain the three primary nutritional components: protein, carbohydrate (sugar), and fat rich foods (Traniello 1983). In turf, they commonly forage on the surface for small insects and insect eggs, however they also are know to tend (protect) subterranean aphids in order to obtain the sugary honeydew that the aphids produce (Lopez et al. 2000). Because these mound-building ants are important predators of

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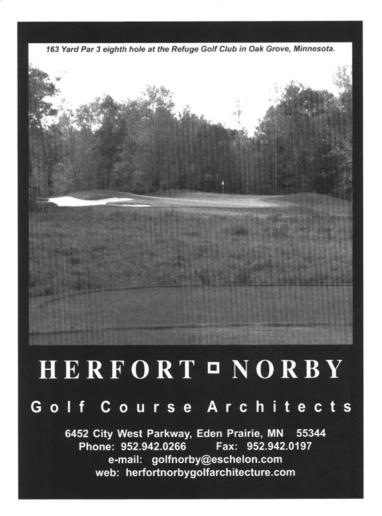
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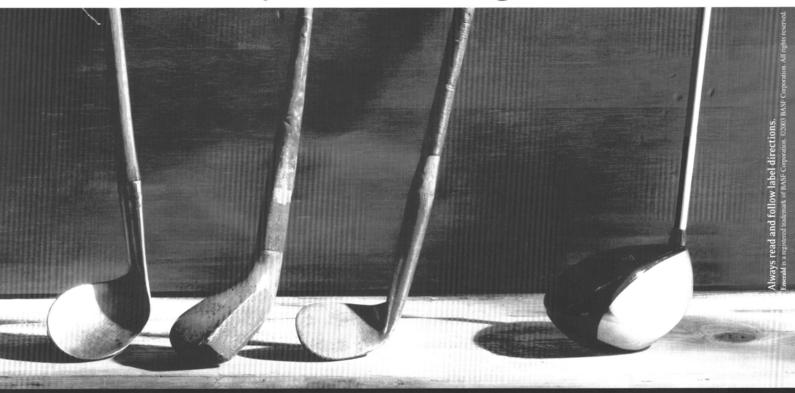


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the eggs and small larvae of sod webworms, white grubs, and other insect pests, they are also considered beneficial insects.

Control Options

Unfortunately, ant control often is not so simple; in fact it can be quite difficult, especially at different times of the growing season. Because throughout much of the growing season, the queen ant, with her eggs and larvae (young) located underground in nests, surface applications of contact insecticides are only effective in controlling workers on the turf surface. Thus, unless the queen is eliminated, more worker ants will continue to be produced. Currently, there are three different recommended approaches for managing mound-building ants: 1) insecticide treatment applications, in the spring when ant mounds first appear, with relatively short-residual, contact insecticides. Bifenthrin (Talstar), chlorpyrifos (Dursban Pro), and cyfluthrin (Tempo), deltamethrin (DeltaGard). and lambdacyhalothrin (Scimiatar) may provide up to 4 - 6 weeks of control; 2) applications of long-residual insecticides such as thiamethoxam (Meridian, not currently registered), fipronil (Chipco Choice, not registered in northern states and can ONLY be applied to golf course turf by licensed and authorized commerapplicators) or Chipco TopChoice, currently registered in most but not all northern states), and imidacloprid (Merit) may potentially provide season-long control when applied to mounds as they first appear, or 3) granular ant baits such as Advanced Granular Carpenter Ant Bait (abamectin), Maxforce (hydromethylon), and Firestar (fipronil) may provide 2 - 3 weeks of control (Shetlar 2003). However, because ants are quite sensitive to the quality (freshness) of the bait, it is understood that moisture renders most baits unattractive. likely due to staleness. Therefore, it

is critical to apply baits to dry turf; avoid applications prior to anticipated rainfall events and be sure to withhold irrigation for approximately 48 hours.

To further complicate the rather difficult challenge of controlling mound-building ants, during the late-summer and early-autumn months, as described earlier, ants a distinctively different have behavior. During this time, large numbers of swarmers emerge from their nests in the late afternoon. In this situation, the most effect management approach would be to apply a surface applied, contact insecticide such as bifenthrin (Talstar), chlorpyrifos (Dursban Pro), cyfluthrin (Tempo), deltamethrin (DeltaGard), or lambda-cyhalothrin (Scimitar) to the turf surface with intention of controlling the swarming ants before they have an opportunity to mate and construct new chambers (Williamson 2001).

Due to the variation in behavior of mound-building ants within a growing season, it is apparent that a comprehensive understanding of the behavior and habits of a pest organism is essential in order to achieve effectively management. Therefore, additional research is needed to better understand the biology of mound-building ants in order to further develop and refine management strategies and tactics.

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Hanging by a (Red) Thread

By Steve Abler and Dr. Geunhwa Jung, Turfgrass Diagnostic Lab, Department of Plant Pathology, University of Wisconsin-Madison

In keeping with my recent theme of look-alike diseases, I thought that I would cover a disease that is relatively easy to diagnose, yet is often mistaken for other diseases.....red thread.

Red thread is the oldest recognized foliar disease of turfgrasses. It was first diagnosed in Australia in 1854, and was first reported in the United States in the 1920s. The disease is caused by the fungus *Laetisaria fuciformis*. This pathogen is able to infect and colonize all cool season turfgrasses grown in Wisconsin; however, the most severe disease symptoms are most commonly found on the fine-leaved fescues and perennial ryegrass. Symptoms of red thread in golf course roughs are manifested as roughly circular, white patches of blighted grass a few inches to a few feet in diameter (Figure 1). The edges of the patches appear ragged because there is often healthy grass blades intermixed with the affected, bleached blades.

On closely mown grasses, such as those on golf course fairways, the patches are usually less than a foot in diameter and have more distinct margins (Figure 2). Tufts of cottony pink to reddish mycelium of the fungus may be found scattered in active patches during weather conditions conducive for disease development.

The key diagnostic feature of the disease is the presence of red, filamentous fungal sclerotia emanating from colonized leaf blades (Figure 3). These distinct sclerotia are the basis for the name "red thread." Weather conditions that are optimum for disease development include periods of extended leaf wetness and daytime air temperatures between 60-80°F. It is not uncommon for red thread to be active at temperatures as low as the mid-thirties or into the mid-eighties when there are long durations of leaf wetness. Therefore, limiting the time in which the leaf blades are wet serves to reduce disease incidence.

Laetisaria fuciformis is a strictly foliar pathogen and usually does not kill the grass plant. Red thread is most severe on slowly growing grasses; therefore, practices that reduce the growth rate of the turfgrasses, such as the use of plant growth regulators, will increase the occurrence and intensity of red thread.

On the other hand, applications of water soluble nitrogen fertilizer will stimulate foliar growth and reduce disease symptoms. There are over a dozen fungicides labeled for the control of red thread. Of these, the strobilurins (azoxystrobin, pyraclostrobin, trifloxystrobin), and the sterol inhibitors (fenarimol, myclobu-



Figure 1. Red thread patch on a perennial ryegrass rough.



Figure 2. Red thread patch on a perennial ryegrass fairway.



Figure 3. Red sclerotia of the red thread pathogen.



Figure 4. Pink tufts of mycelium of the pink patch pathogen.



Figure 5. Red thread patches on a fine fescue fairway that resemble dollar spot.

tanil, propiconazole, triadimefon) have been shown to be highly efficacious (Couch et al., 2000 and 2002).

Of the handful diseases that often resemble red thread, the symptoms of Limonomyces pink patch (incited by Limonomyces roseipellis) are nearly indistinguishable from those of red thread. The grasses that the red thread and pink patch pathogens prefer to colonize and the weather conditions that are conducive for disease are so similar that both pathogens are commonly found in the same patch. It took researchers until the 1980s to discover that there were two closely related pathogens which cause the symptoms previously only attributed the red thread pathogen.

Pink patch is so named because it usually produces tufts of pinkish mycelium that look like cotton candy on colonized turfgrasses (Figure 4). Red thread and pink patch can be distinguished from each other because the pink patch pathogen does not produce red sclerotia that are characteristic of red thread. Also, when the filamentous hyphae of *L. roseipellis* are examined using a microscope, they have structures called clamp connections. The hyphae of *L. fuciformis* do not produce clamp connections.

Recently, a new biotype of *L. roseipellis* which infects and colonizes tall fescue was reported in Georgia and was named "cream leaf blight" (Burpee et al., 2003). This biotype resembles the red thread and Limonomyces pink patch pathogens. Although the hyphae of the pathogen

do not have clamp connections, it was determined to be more closely related to the Limonomyce pink patch pathogen than to red thread pathogen on the basis of additional morphological and physiological characters of the hyphae as well as DNA sequence analysis. The good news for golf course superintendents is that because the pathogens are closely related, cultural and chemical control measures for pink patch are the same as the control methods for red thread.

Two other look-alikes of red thread are Microdochium patch and dollar spot. Since red thread and Microdochium patch are often a problem during cool, wet weather of the early spring and late fall seasons and both produce whitish patches, they are often confused with each other.

Symptoms of Microdochium patch can be distinguished from those of red thread because patches produced by *Microdochium nivale* do not contain red sclerotia, usually have dark red borders, and do not have green grass blades amongst diseased blades like red thread patches. Additionally, *M. nivale* prefers annual bluegrass and creeping bentgrass as hosts and produces abundant spores that are revealed when colonized leaves are microscopically examined.

When the weather begins to warm in the late spring or cool in the fall of the year, the symptoms of red thread can also resemble dollar spot on closely mown grasses of golf course fairways (Figure 5). Dollar spot patches can be distinguished from red thread patches because dollar spot patches do not contain red sclerotia, and leaf blades colonized by the dollar spot pathogen often have distinct white lesions with reddish-brown borders. Additionally, the mycelium of dollar spot are white to gray in color and dollar spot patches do not have green blades intermixed with diseased blades like red thread patches.

I think that it is easy to see that there are several diseases that mimic each other during the spring and fall seasons. It is very easy to confirm or rule out red thread as the cause of the problem by looking for the distinctive red, thread-like sclerotia of the pathogen. The hardest part of the diagnosis is getting down on your hands and knees to gaze at the grass.

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Variety in Work and Sports Spices Up His Life

7

By Lori Ward Bocher

If variety is the spice of life, then Ray Shane, golf program supervisor for the City of Madison, is well seasoned. From golf professional to golf course superintendent, from a private country club to four city-owned courses, from working long hours seven days a week to having a 40-hour/5-day work week, Ray has seen it all. Even his newfound competitive sport, participating in IronMan competitions, finds him training in three different activities swimming, biking and running.

Ray's life was heavily spiced in 1969 when, the summer before his freshman year in high school, his father moved the family from Spokane, Washington, to Sun Prairie, Wisconsin. Not knowing anyone that first summer, Ray turned to the nearby golf course, Sun Prairie Country Club, for some diversion. "The golf course was right there," he recalls, "so I started playing the game and hanging out at the course to give me something to do and to meet other kids."

That first summer he also started working evenings picking up balls on the driving range. "The next summer I worked on the grounds crew at night, watering the greens," he continues. "They still had the manual irrigation system where you had to drag hoses and plug in sprinklers. So I did that every summer until I graduated from Sun Prairie High School in 1973."

By then he was bitten by the golf bug, so he decided to become a golf professional by entering the PGA apprenticeship program right out of high school. "The program has changed a lot in the past 30 years, but when I went through it was a five-year program," Ray explains. "I worked under the



direction of a Class A golf professional at Watertown Country Club, and I attended PGA schools across the country.

"At the schools they taught us about the business end of golf courses, a little bit about teaching the game of golf, and a very minor section on golf course maintenance - just enough to give you a basic understanding so that you could talk to players and members with some knowledge about why superintendents do what they have to do," he continues.

Ray finished the program in five years and was elected to membership in the PGA as a Class A member. For one year he worked as the head golf professional at what was then the Olympia Resort in Oconomowoc. Then in 1978 he became the professional at Portage Country Club, a 9-hole course at the time. And there he stayed for 12 years.

Takes on a dual role...

But three and one-half years into the job he received a heaping dose of variety that spiced up his life once again. Ray explains: "The board of directors had decided that they needed a change in the maintenance of the course, so they told the superintendent in July that they would not be renewing his contract the next year; they told him early so he would have time to look for a new position. Instead of working out the season, he resigned immediately.

"That left the club in a quandary as far as what to do for the rest of the year," Ray continues. "So they asked me if I would oversee the maintenance of the golf course until they could get a new superintendent. I said I'd give it my best shot. I tried to educate myself by contacting vendors and other people, buying books on turf management, joining the superintendents' association. To make a long story short, when the end of the year came the board said to me, 'Ray, we really like what you've done with the golf course since taking over. Would you be interested in doing a dual role as superintendent and golf professional?"

"I accepted," Ray continues. "That's what got me into the golf course maintenance end of the business. I knew what a golf course was supposed to look like and how I wanted it to play, but I had no idea of how to get it there. I spent the next several years learning all I could about maintaining turf."

There was more spice to come. In the mid 1980s Portage Country Club decided to expand from 9 to 18 holes. "I was able to get involved from the beginning - the purchasing of the land, the design, the construction and grow-in of the new 9," Ray points out. "That showed me a whole new area of golf course maintenance. It was really quite the experience."

A balancing act...

Of course, during all of these years Ray was still working as the golf professional at the club, too. It was quite



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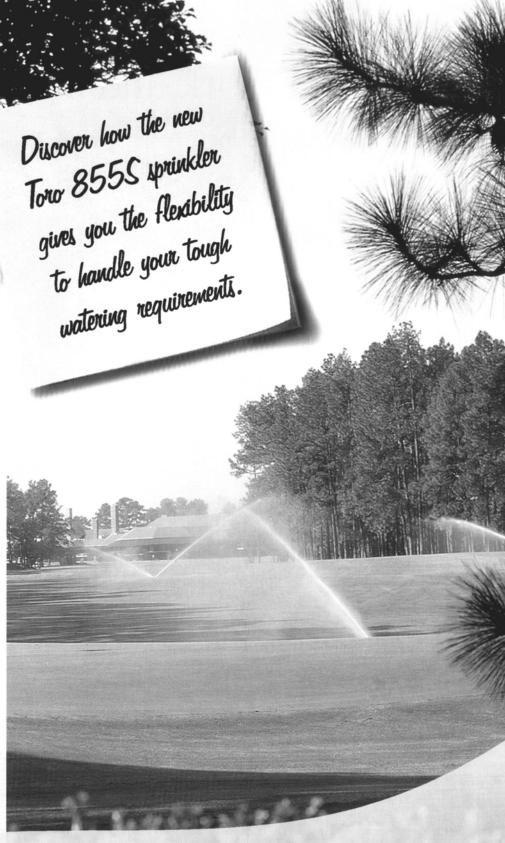
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a balancing act. "I was wearing more hats than normal," he relates. "I would get to the course early in the morning and get the maintenance crew going. There wasn't a lot of early morning play because it was a small, private club. So I could work with the grounds crew until about 9 in the morning.

"Then I'd go up to the clubhouse, take a shower, change clothes, work in the golf shop, and direct the maintenance activities from there until mid afternoon or so. If necessary, I'd go back out on the golf course. Those were long days, seven days a week. But what a great experience."

Ray also credits his staff for making it possible for him to do two jobs on the course. "If you set up your programs properly and do a good job of teaching, you can delegate a lot of responsibility," he says. "I had a couple of really good assistant golf pros in the shop who knew exactly how I wanted things done. Same thing on the golf course maintenance end of it. It went fairly smoothly."

While wearing his golf professional hat, what was Ray's biggest reward? "Working with the junior programs and high school programs. introducing and teaching the game to kids," he answers. "That was really great. I also enjoyed the interaction with the club members and putting on the golf tournaments. Certainly, as a golf professional you have a lot more interaction with the customers than you do as a golf course superintendent."

His greatest accomplishment as a golf professional at Portage? "I took the country club's junior program, which at the time was open only to the members' kids, and we opened it up to the general public. The program grew from 25 kids my first year there to 80 by the time I left. It was nice to see that growth," he answers.

Already accustomed to a job with a spicy variety, in January of 1990 Ray started another position with a great deal of variety - 'golf program supervisor' with the City of Madison. "I made the change for a couple of reasons," he explains. "The long hours, seven days a week, were starting to get to me a little bit. I was ready for a new challenge. I was 35 years old, so the benefits package of the city looked good. My daughter was young and we wanted to be able to spend some weekend time with her - the soccer games and all the other nice things that come with raising a family. It just seemed like a really good fit at the time."

Ray's biggest adjustment in the new job was working fewer hours. "At Portage the responsibilities were really 24/7. It took a little bit of getting used to coming into a program this size and saying, 'It's 2:30 in the

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Terra International, Inc. • 3525 Terra Court • Sun Prairie, WI 53590 Conrad Stynchula CGCS • (800) 456-0948 (office) • (608) 235-4999 (mobile) afternoon, my eight-hour day is done, I'm going home," he relates. "And I'd wake up on weekends at 5 in the morning and say, 'You know, I don't have to go to work today. What do you do on a Saturday morning?"

Managing four courses...

As the golf program supervisor, Ray is responsible for the four courses that the city owns - Glenway and Monona (9 holes each), Odana Hills (18 holes), and Yahara Hills (36 holes). "If it's happening on a golf course, then it's my responsibility," he adds. About 80 percent of his time is spent dealing with golf course maintenance, and the other 20 percent with clubhouse operations. But he no longer works as a golf professional.

"We have PGA golf professionals that are independent contractors for the City of Madison," Ray explains. "They run our clubhouses and golf programs. My responsibilities with them are to make sure they're fol-

lowing the guidelines of the contract. They collect our greens fees, so I'm in charge of auditing the books and making weekly deposits with the city. And I take care of clubhouse projects and maintenance - roof repairs, new carpeting, getting the ice machines fixed, making sure the air conditioning units are being serviced — things like that."

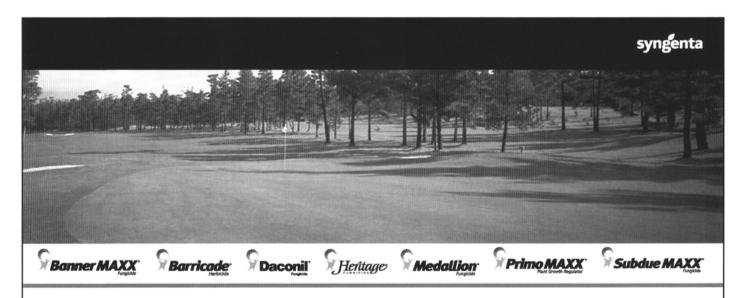
Ray's office is at Yahara Hills, but he spends a lot of time on the road between the courses and various city offices. "Typically I start out at Yahara Hills at about 5 a.m. to get the doors open, make the coffee, and greet our crews," he explains. "I'll get reports from the other three golf courses as far as what their plans are for the day. If there's anyone absent or sick, I need to write that into my reports and send it downtown.

"From there it just changes from day to day," he continues. "This morning I spent time reconciling our credit card reports from the different superintendents. I ran over to Odana Hills to talk to the superintendent about some projects there. I ordered some bunker sand for a couple of courses. I made my trip downtown to the accounting office to make a weekly deposit of greens fees. And then I came back to my office for this interview at 9:30.

"The nice thing about this job is that every day is different," Ray says. "It keeps me going. One day is never the same as another. That's what I love about the golf course business."

Tax-free funding...

Even though Ray's four courses are city-owned, they are completely self sustaining; no taxpayer money is used to support them. So Ray is no stranger to budget challenges. "The last two years our revenues did not cover our expenses," he points out. "But we are lucky in the fact that any excess revenues in good years go into a reserve account to cover years when there's a shortfall. But we've



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