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"Ahead of hurricane season we do a massive trimming program," Weber says. "We take coconuts off the palm trees and pick up all the loose stuff."

Level says the university has a set procedure the grounds crew follows during a hurricane threat. "We have a red team and a blue team," Level explains. "One is on call while the other goes home and gets ready to clean up after."

Lefler says the last hurricane to directly hit the Miami area was in 1965. Still, he charts the paths of all recent hurricanes along the Atlantic coast.

Another problem is Haitian and Cuban employees. Most are not trained in groundskeeping, and often the language barrier makes it difficult for Weber to communicate.

He has learned a bit of Spanish to open communication lines. That's not uncommon for a landscape director who holds degrees in history, hotel and restaurant management, and horticulture.

The crew seems to enjoy working at the only major U.S. university in the subtropical zone. (Texas, Arizona and California are subject to freezes lasting consecutive days.)

Weber says sometimes it's hard to motivate the crew in the steaming summer heat and he gives them more frequent breaks to cope with high temperatures and high humidity.

Some crew members pick their own coconuts from the campus palm trees, freeze them, and drink the ice cold juice for relief.

The most recent project is re-landscaping the panhellenic building. Lefler says such special projects usually cost an estimated $3,000 to $25,000. He describes his general maintenance budget as "just over $500,000."

The University of Miami is home to about 15,000 students, many of whom come from out of state for the warm weather and beach not even 10 miles from campus.

The traffic through the campus can damage plant materials. It has become second nature to Weber and Level to tear down signs stapled to tree trunks as they walk by.

Both have such easy going personalities that they quickly overlook the damage done when students sit on plants or tear leaves off shrubs. "That's OK. They should enjoy the atmosphere," says Weber. "You can't worry that everyone's going to step on your plant...As long as they don't bang it up too much."

To campus visitors and even returning alumni the campus doesn't look "banged up" at all.

"In the last year we've had very positive reports," Lefler says. "The exciting thing is when someone who graduated six or seven years ago returns. The change is so dramatic."

The radical changes are past now. Small planting projects, the addition of even more varieties of palms, and design modifications in conjuction with several building renovations are planned in the future.

Although the university's new look was first envisioned by only one man, everyone on campus now shares in the pride of maintaining it. The University of Miami is a tropical paradise. **WT&T**

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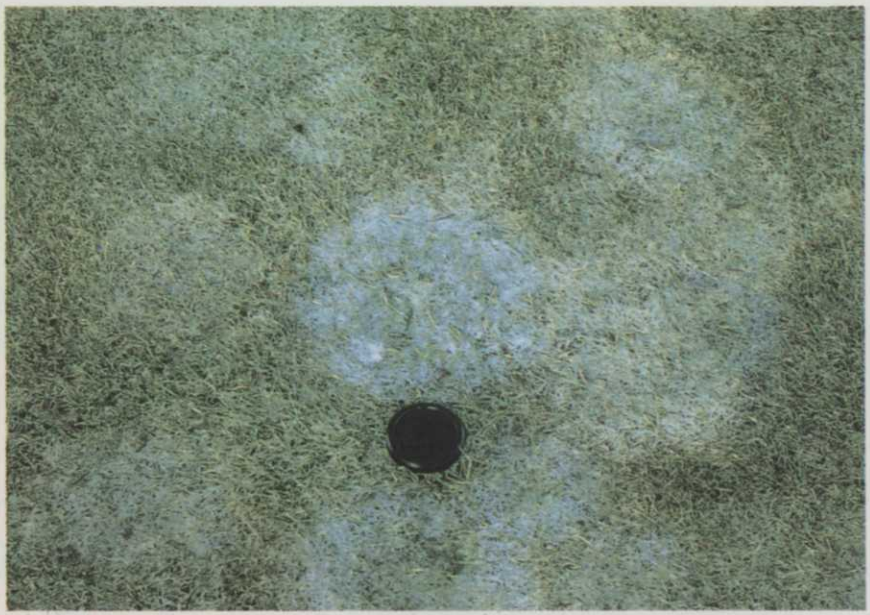
COOL-SEASON TURF DISEASES

by J.M. Vargas, turfgrass pathologist, Michigan State University



Typhula blight or gray snow mold.

Concepts about turfgrass diseases and their management have gone through many changes in the past few years, including the scientific names of the organisms that cause them.

These diseases, the organisms that cause them, and their cultural, biological, and chemical management tools are given in Table 1 (page 46).

The following will be a discussion of the latest developments on cool-season turfgrass diseases.

The patch diseases

There are a group of diseases that produce patches on desirable turfgrass species primarily by attacking the root system of the plants. This group of diseases was often mistakenly referred to as **Fusarium** blight in the past.

There are many other patch diseases of turf but they primarily attack the foliage, crowns, rhizomes, and stolons.

Summer patch

It has become increasingly evident over the past few years that summer patch, caused by *Phialophora graminicola*, is a primary disease of annual bluegrass during warm weather.

It can also be found on Kentucky bluegrass and fine-leaf fescues, but far less frequently.

On annual bluegrass, the initial symptoms are a yellowing of the turf in patches, usually 6 inches to one foot in diameter, followed by a thinning of the turf with the remaining turf turning bronze in color.

If warm weather persists all the turf in the patches may die. Most of the creeping bentgrass cultivars are resistant, and creeping bentgrass frequently can be seen recolonizing the centers of these patches.

Preliminary data indicate that soil temperature and soil moisture may be important in the development of this disease.

Excessive irrigation during hot periods or absence of irrigation following the hot period may make the diseases more severe.

Fungicides for the management of summer patch can be found in Table 2 (page 46). High rates of application are required to manage this disease and fungicides such as Tersan 1991, Fungo 50, and Cleary's 3336 will have to be drenched in to be effective.

Necrotic ring spot

It now appears that necrotic ring spot, caused by *Leptosphaeria korrae*, is the primary patch disease found on Kentucky bluegrass.

The symptoms can be observed throughout the growing season even though *L. korrae* appears to be most active during the cooler weather of the spring and fall. The plants that were infected by *L. korrae* in the cooler weather are in a weakened condition and are very susceptible to summer heat stress or drought stress.

Subjecting the necrotic ring spot plants to either of these stresses will lead to the death of the weakened plants and the recurrence of symptoms, even though the pathogen may not be active at this time.

The initial symptoms are patches 6 inches to two feet in diameter with straw- and red-colored blades intermingled in the patch.

Older patches may have green grass in their centers with the straw- and red-colored blades in the outer area of the ring, giving a frog-eye appearance. When symptoms appear in the warm weather, the red blades are often scarce.

Nitrogen is important for recovery of the patches caused by necrotic ring spot. Three to five pounds of actual nitrogen/1,000 sq. ft./season is necessary to promote recovery of necrotic ring spot patches.

Proper cultural practices are also important in patch recovery and in the prevention of new ones.

These include coring to relieve compaction and layers that result when sod of one soil type is laid on top of soil of another, which is common practice during the establishment of home lawns and commercial

continued on page 48

Resplendent in the afternoon sun, Dodger Stadium, home of the Los Angeles Dodgers, plays host to another record setting crowd.

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RANSOMES

Circle No. 147 on Reader Inquiry Card

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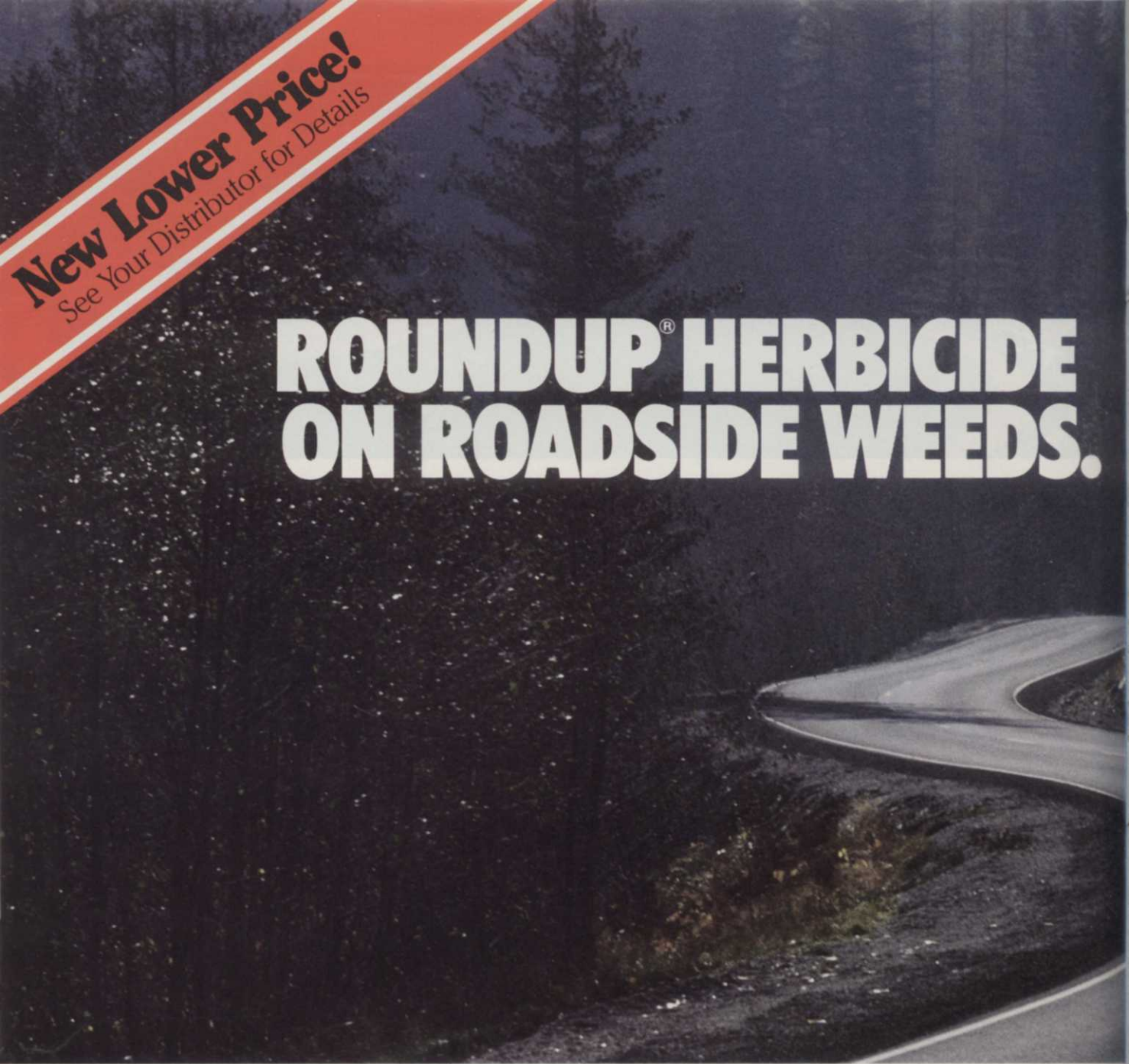

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Circle No. 137 on Reader Inquiry Card

TABLE 1
The patch disease, casual organism and primary host.

Disease	Organism	Primary Host
Summer patch	*Phialophora graminicola*	Annual bluegrass
Necrotic ring spot	*Leptosphaeria korrae*	Kentucky bluegrass
Take-all patch	*Gaeumannomyces graminis*	Creeping bentgrass

Red thread on perennial ryegrass.

lawn properties.

This results in short rooting during the warm weather (when the roots of the turfgrass plant are confined to the upper layer).

Coring and re-incorporating the soil back into the thatch will, over a period of years, alleviate the layering problem. It may also help manage any potential thatch problem, which is important in managing necrotic ring spot. Thatch has a poor moisture holding capacity, and turfs growing in a thick thatch are more susceptible to drought stress.

Light, frequent irrigation is also important in managing this disease. The theory that deep, infrequent irrigation is more beneficial to turf development is just that, a theory. Preliminary research data indicates that light, frequent waterings may be more beneficial to the turf. Such waterings on a daily basis, around midday, have certainly been shown to help manage necrotic ring spot. The turf appears to be benefitting culturally from the cooling of the turf and biologically from the build-up of beneficial micro-organisms in the moist thatch that may be antagonistic to *L. korrae*.

Lawn Restore, Green Magic, and Strengthen and Restore are products which appear to be supplying some biological management of necrotic ring spot. These products contain antagonistic micro-organisms (Lawn Restore) or their by-products (Green Magic, Strengthen and Restore). They have been effective in promoting the recovery of necrotic ring spot patches and preventing the development of new ones.

The key word is "management." These products are not a one-shot cure, but used systematicaly on a regular basis, they will manage this disease and provide a healthy turf.

In addition to the antagonistic micro-organisms and their by-products, these products contain the major and micronutrients necessary for a healthy turf.

Take-all patch

Take-all patch, caused by *Gaeumannomyces graminis* var. *avenae* was formerly known as *Ophiobolus* patch caused by *O. graminis*.

This disease was originally thought to be confined to the Pacific Northwest. It has now been reported throughout the United States and Canada wherever creeping bentgrass is grown.

Lowering the pH through the use of sulfur still appears to be the best way to manage this disease.

A word of caution: the granular sulfur products have been observed to cause injury to the turf the season following application. This injury initially resembles dollar spot. The sprayable sulfurs are just as effective and do not have the bad side effects.

OTHER DISEASES

Dollar spot

Dollar spot was considered a disease which occurred primarily on golf courses. However, with the introduction of the new perennial ryegrasses, it is becoming an important problem on home lawn turfs.

The disease was originally believed to be caused by *Sclerotinia homoeocarpa*, but is now believed to be caused by two other organisms, a *Lanzia* spp. and a *Moellerodiscus* spp.

Identification of the two fungi as dollar spot's cause helps explain some of the confusion that has existed about the occurrence of this disease.

It has been, and still is, considered both a cool-weather and warm-weather disease. Two different fungi appear to have caused a disease with similar symptoms. This means that you can have dollar spot at any temperature between 60 to 85 degrees F.

An easy, reliable method to distinguish the difference between these two fungi in the field is thus needed.

Fortunately, dollar spot caused by both fungi appears to be reduced by adequate nitrogen levels. For the most part, they are also managed by the same fungicides, although the question is raised whether to some fungicides might not be due to the differential sensitivity of the two fungal species causing this disease.

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TABLE 2
Turf Disease and Controls.*

Disease	Causal Agent	Hosts	Biologial and Cultural Control	Chemical Control
Anthracnose	*Colletotrichum graminicola*	Annual bluegrass Fine-leaf fescue Kentucky bluegrass Perennial ryegrass	Adequate nitrogen. Cool grass by syringing.	Maneb plus zinc sulfate, chlorothalonil, benomyl, thiophanate-methyl, thiophanate, thiophanate-methyl + mancozeb, triadimefon
Brown patch	*Rhizochtonia solani*	All major turf-grass species	Reduce nitrogen. Remove "dew." Increase air movement.	Mancozeb, maneb + zinc sulfate, chlorothalonil, anilazine, cycloheximide + thiram, benomyl, thiophanate-methyl, thiophanate, thiram, thiophanate-methyl + maneb, cadmium compounds, thiophanate + thiram, PCNB, iprodione, vinclozolin
Dollar spot	*Lanzia spp.* *Moellerodiscus spp.*	Annual bluegrass Bahiagrass Bermudagrass Centipedegrass Colonial bentgrass Creeping bentgrass Fine-leaf fescues Kentucky bluegrass Perennial ryegrass St. Augustinegrass Zoysiagrass	Increase nitrogen. Remove "dew."	Benomyl, thiophanate, thiophanate-methyl, chlorothalonil, anilazine, cycloheximide + PCNB, cadmium compounds, thiophanate + thiram, thiram, thiabendazole, benomyl, iprodione, thiophanate-methyl + maneb, vinclozolin, triadimefon, fenarimol
Summer patch	*Phialophora graminicola*	Annual bluegrass Kentucky bluegrass	Light, daily watering during the summer.	fenarimol, thiophanate-methyl, thiophanate, triadimefon, iprodione, benomyl
Helminthosporium Diseases	*(Dreschlera)*			
Brown blight	*D. siccans*	Ryegrass	Remove clippings. Raise cutting height. Plant resistant cultivars. Moderate spring nitrogen. Daily irrigation.	Mancozeb, chlorothalonil, cycloheximide, anilazine, maneb + zinc sulfate, cycloheximide + thiram, cycloheximide + PCNB, iprodione, vinclozolin
Leaf blotch	*D. cynodontis*	Bermudagrass Kentucky bluegrass
Melting-out	*D. poae*	Fescue Creeping bentgrass
Net-blotch	*D. dictyoides*	Bermudagrass
Red leaf spot	*D. erythrospila*	Bermudagrass
Stem and crown necrosis	*D. specifera*	Bentgrass, fine-leaf fescue, Kentucky bluegrass
Zonate Eye spot Leaf spot	*D. gigantea* *Bipolaris sorokiniana*	

Brown patch

Brown patch was a disease believed to occur primarily on golf courses. However, again, with the introduction of the new improved perennial ryegrasses into home lawn turfs, it is also becoming a problem on home lawns.

The disease occurs under hot, humid conditions. It can be culturally managed by reducing the amount of nitrogen applied just prior to the advent of warm weather, and by increasing air circulation by removing and/or pruning trees or shrubs.

Pythium blight

Pythium blight was also a disease primarily occurring on golf courses, but, like dollar spot and brown patch, it is becoming more of a home lawn problem with the incorporation of the improved perennial ryegrasses into home lawn turfs.

There still seems to be some controversy over how many species of *Pythium* are involved in this disease. But regardless of how many or how few there are, they do tend to cause rapid loss of turf in hot, humid weather. Unlike many diseases where only the foliage is damaged and recovery occurs quickly, *Pythium* blight usually kills the plant. This means recovery in the infected areas will be slow because it will have to come from rhizomes or stolons that fill in from outside the spots or by germination of annual bluegrass or broadleaf

continued on page 54