Spec Series

Spec the Best...

Expect a Lot

When your reputation is on the line, second best just won't do. Introducing the Spec Series from Rain Bird — products designed to provide the ultimate in performance.

When your name is on it, be it a blueprint or a controller case, you want it to be the very best. Rain Bird has designated a selection of key products as the Spec Series. The best.

Each uniquely Rain Bird. Exacting. Precise. Dependable.

Each a leader in water management design. Maxi III and the ISC Series controllers. Pressure regulating valves. Spray heads with matched precipitation rate nozzles. State-of-the-art rotors. Serious products for serious applications.

Look for the blue Spec Series strip . . . the best . . . from Rain Bird.

RAIN BIRD

For more information on the complete Spec Series, write:

Rain Bird Sales, Inc. Turf Division, 145 N. Grand Ave., Glendora, CA 91740

Circle No. 150 on Reader Inquiry Card

Diseases of Northern Turf

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

New findings and changing attitudes have improved turf disease control over the last few years.

Researchers are discovering more about the actual disease-causing organisms. In a few cases, researchers have discovered a combination of pathogens is involved in causing a particular disease. As a result, a combination of fungicides is needed to achieve control. Fungicides are being directed more effectively at the pathogens.

At the same time, new findings about the effects of certain cultural practices on certain turf varieties are providing clues to disease management. For example, safe mowing heights and fertilization rates are different for different varieties of grass.

Definite progress is being made in turf disease management. All turf managers should reevaluate their disease control programs to consider all new information and all new products available.

Dollar spot

Dollar spot is found primarily on golf course grasses, such as creeping bentgrass and annual bluegrass, when the temperature is between 60-85 degrees F.

Two fungi cause the symptoms of the disease on turf, *Lanzia* spp. and *Moellerodiscus* spp. Both fungi appear to be managed by the same large selection of fungicides, although one has to wonder if resistance to some fungicides might not be due to the differential sensitivity of the two fungi. (See Table 1)

What is needed is an easy, reliable method to distinguish between these

Pythium blight *rapidly strikes ryegrasses and other turfs where drainage is poor in hot and humid weather. Recovery is slow since pythium usually kills the entire plant.*

two fungi in the field.

Fortunately, dollar spot caused by both fungi appears to be reduced by adequate nitrogen and soil moisture levels.

Brown patch

Brown patch occurs under hot, humid conditions, primarily on golf courses. The disease is also infecting home lawns containing some of the new improved perennial ryegrasses.

It can be culturally managed by reducing the nitrogen applied just prior to the advent of warm weather and increasing air circulation over turf areas. A fairly large choice of fungicides is available for control of Brown patch.

Pythium blight

Pythium blight is also found on golf courses and home lawns containing perennial ryegrasses. The seriousness of the disease is greater than some turf diseases since Pythium blight usually kills the entire plant, not just foliage.

Pythium causes rapid loss of turf in hot, humid weather. Recovery of infected areas is slow since regrowth must come from stolons and rhizomes of nearby healthy plants. Annual bluegrass or broadleaf weeds often move in before healthy turf spreads into the damaged area.

Cultural management of Pythium blight consists of reduced nitrogen levels just prior to the advent of warm weather and improving drainage.

A combination of systemic fungicide followed by a contact fungicide is recommended for control of Pythium blight.

The systemic fungicides include metalaxyl (Subdue, Ridomil, Apron) and propamocarb hydrochloride (Banol). Check the label for the appropriate application rate for the specific kind of turf. Although the active ingredient may be the same, the concentration and the rate may vary.

Systemic fungicides will manage the disease for up to three weeks. Little spread of the disease occurs after the systemic fungicides are applied, although mycelium of the fungus may remain evident on the previously infected tissue for a couple of days.

No actual resistance to these two fungicides has been reported, but the possibility exists. It is wise therefore to follow each systemic fungicide application with an application of contact fungicide (chloroneb or ethazol) in case resistance develops. The contact fungicide will prevent the resistant strain of fungus from devastating the turf.

Anthracnose

Anthracnose is primarily a disease of annual bluegrass, although it will attack fine leaf fescues, perennial ryegrasses, and seaside creeping bentgrass. The fungus causing the disease is *Colletotrichum graminicola*.

Annual bluegrass dies from anthracnose during heat stress periods of the summer. This is not due to heat alone, as was once believed. If proper cultural management is followed, and effective fungicides are used, annual bluegrass will survive the summer heat stress period like any other perennial.

Good cultural practices consist of deep vertical mowing early in the spring, as soon as growth is initiated for the season. This will allow for production of new juvenile growth which should be more resistant to heat stress.

Vertical mowing should be followed by coring a week or two later for good root growth. A second coring should be made following heavy seedhead production in late spring to provide an optimum medium for maximum root growth in the remaining weeks prior to heat stress.

More than 70% of the roots of annual bluegrass disappear during heavy seedhead production. If only one coring a year can be made, this is the time to do it. A third coring should be made when the cool nights return in late summer and early fall.

Light nitrogen applications (½ lbs. actual N per 1,000 sq. ft.) should be made in June, July and August. This produces healthier annual bluegrass and reduces the amount of inoculum produced by *C. graminicola* for subsequent infection. Finally, one of the effective fungicides should be used to insure healthy turf.

Snow molds

There are two prevalent snow molds; pink snow mold (*Gerlachia patch*) and gray snow mold (*Typhula blight*).

Pink snow mold used to be known as Fusarium patch caused by *Fusarium nivale*. But the common name of the disease has been changed to **Gerlachia patch** and the scientific name of the causal organism has been changed to *Gerlachia nivalis*.

The disease becomes a problem in the fall when the temperature drops into the low 60's and continues through the spring until daytime temperature climbs back into the 70's. It is usually first noticed in the shaded areas of greens, tees, and fairways.

Gerlachia patch does not need snow cover to become active, only cool wet weather. Annual bluegrass is especially susceptible to Gerlachia patch.

In the spring, the disease is often misdiagnosed as copper spot, because of the small, copper-colored spot that it causes. However, copper spot is a disease that occurs in warmer weather.

Keeping nitrogen levels low when the disease is active may help manage this disease.

Gray snow mold only occurs under snow cover. It does not occur in the cool wet weather of fall and spring, except under leaf piles.

It is caused by two species of fungi depending on geographic location of the infection. *Typhula incarnata* is the primary species in the east, south, and parts of the west and midwest. *Typhula ishikariensis* is most prevalent in northern snow mold regions, especially where prolonged snow-cover exists (two or more months) in the midwest and western U.S.

The two species are easily distinguished from each other when observed soon after the snow melts. *T. incarnata* produces grayish spots in the turf, with a fairly large mass of brown filaments evident. *T. ishikariensis* spots have a reddish cast and contain small, dark black filaments.

Knowing the species is important in treatment of the disease. Many fungicides manage *Typhula incarnata*, but they do not all manage *Typhula ishikariensis*. The treatment picture is more complicated state by state. Check with local turfgrass experts to find out the fungicides that are effective for both species in your area.

Gaeumannomyces patch

Gaeumannomyces (take all) patch caused by *Gaeumannomyces graminis* var. *avanea* was formerly known as Ophiobolus patch caused by *Ophiobolus graminis*.

This disease was originally thought to be confined to the Pacific northwest, but it has since been reported on creeping bentgrass in the coastal areas of New England, New York, and the mid-Atlantic states.

Lowering the pH of the soil with

continued on page 66

If you're not using Daconil 2787® on your golf course, you don't have many alternatives.

Sure you've used other fungicides. Even tried one or two of the new systemics. But they didn't measure up to diseases like dollar spot and brown patch. Tees, greens and fairways had a lot of problems. And you had a lot of headaches.

Unreliable, inconsistent disease control is the biggest reason more and more superintendents are getting back to regularly scheduled applications of Daconil 2787 fungicide. Because Daconil 2787 *is* the most effective and reliable fungicide you can use on tees, greens and fairways.

Daconil 2787 has a proven record of performance when it comes to delivering superior control of ten major turf diseases including: dollar spot (and benomyl-resistant dollar spot), Helminthosporium (leafspot and melting-out) and large brown patch.

What's more, Daconil 2787 resists wash-off. So it's always out there working even during heavy rains or watering. There's no need to add a costly spreader/sticker for full and even plant coverage because it's already built in to the formulation.

And there's never been a documented case of resistance in over 15 years of use.

Plus you just can't beat Daconil 2787 for economy either. As we've been pointing out for the last two years, Daconil 2787 is the most cost-efficient fungicide you can use from tee to green.

So this season make your fungicide Daconil 2787. It's the one fungicide you can count on to save you from a lot of disease problems and a lot of headaches too.

SDS Biotech™

Agricultural Chemicals Business
SDS Biotech Corporation
7528 Auburn Road, P.O. Box 348
Painesville, Ohio 44077

Daconil 2787®

The reliable turf fungicide

Always follow label directions carefully when using turf chemicals.

Circle No. 153 on Reader Inquiry Card

 from page 63

TABLE 1

Turf Disease and Controls*

Disease	Causal Agent	Hosts	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, tridimefon
Brown patch	*Rhizoctonia solani*	All major turfgrass 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
Summer patch	*Phialophora graminicola*	Annual bluegrass Kentucky bluegrass Centipedegrass	Light, daily watering during the summer.	fenarimol, thiophanate-methyl, thiophanate, tridimefon, iprodione, benomyl
Helminthosporium Diseases	*(Dreschlera)*			
Brown blight	*D. siccans*	Ryegrass Bermudagrass Bentgrass, Fine-leaf fescue, Kentucky bluegrass	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*			
Leaf spot	*D. sorokinianum*			
Melting-out	D. poae	Kentucky bluegrass		
Net-blotch	D. dictyoides	Fescue		
Red leaf spot	D. erythrospilum	Creeping bentgrass		
Stem and Crown Necrosis	D. speciferum	Bermudagrass		
Zonate eye spot	D. giganteum	Bermudagrass		
Gaeumannomyces patch (Take all patch)	*Gaeumannomyces graminis*	Creeping bentgrass Kentucky bluegrass Velvet bentgrass	Reduce soil pH. Avoid liming. Use acidic fertilizers. Sulfur.	None.
Pythium blight (cottony blight)	*Pythium* spp.		Improve soil drainage. Increase air circulation.	Chloroneb, ethazol, metalaxyl, propamocarb, hydrochloride
Red thread	*Laetisaria fusiformis*	Creeping bentgrass Colonial bentgrass Bermudagrass Annual bluegrass Perennial ryegrass Fine leaf fescues	Increase nitrogen	anilazine, iprodione, triadimefon, vinclozolin, chlorothalonil
The Snow Molds				
Typhala blight	*Typhula* spp.	Annual bluegrass Colonial bentgrass Creeping bentgrass Fine-leaf fescues Kentucky bluegrass Perennial ryegrass Tall fescue Velvet bentgrass	Avoid early fall nitrogen fertility that leads to lush growth.	Mercury compounds, PCNB products, chlorothalonil, chloroneb. These products may have to be used in combination for effective snow mold management. Benomyl, Iprodione or Mancozeb will control *Gerlachia* patch where it occurs alone.
Gerlachia patch	*Gerlachia nivalis*			
Yellow patch	*Rhizoctonia cerealis*	Kentucky bluegrass Creeping bentgrass	Nitrogen to promote recovery.	Iprodione, fenaromil

*The order in which fungicides are presented does not imply the order of their effectiveness

A LOT IS ON THE LINE

With Safe Athletic Fields

*Player Injuries * Team Records * Alumni/Fan Support*
*The Spirit of Sports * Your Job*

Why face all this responsibility alone? There is an association of fellow sports field managers waiting to share their experiences with you. Members of the Sports Turf Managers Association include grounds superintendents of high school and college campuses, park superintendents, and field managers for professional football, baseball, and soccer teams. Each member has something to lend to the advancement of athletic field management.

STMA members manage utility turf, fine turf, cool-season turf, warm-season turf, clay fields, sand fields, and even artificial fields. They are anxious to share what they have discovered that works.

The bottom line is budgets are matters of fact, not luck or secrets. And, today, persons responsible for millions of dollars of recreational property need facts.

STMA members exchange their ideas through a bimonthly newsletter, regional seminars, and an annual conference and show. The membership directory puts the names and phone numbers of fellow members and suppliers at your fingertips for help in emergencies, or just for bouncing ideas off of each other.

Be your own expert with the help of fellow sports field managers. Fill out the membership coupon below and mail it today. You don't have to face the challenges of sports field management by yourself anymore.

Sports Turf Manager's Association

MEMBERSHIP CATEGORIES

1 PROFESSIONAL, SCHOLARSHIP FACILITY MANAGERS ($50) ☐

2 EDUCATORS/ PARKS, HIGH SCHOOLS ($30) ☐

3 STUDENTS ($10) ☐

4 COMMERCIAL/ AFFILIATES ($100) ☐

Please send check for appropriate amount to Sports Turf Managers Association, c/o Don Marshall, Anaheim Stadium, 2000 S. State College Blvd., Anaheim, CA 92806. For more information contact Kent Kurtz, executive secretary, STMA, **(714) 598-4167.**

NAME _____

TITLE _____

FACILITY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE NUMBER _____

SIGNATURE _____

sulfur appears to be the best way to manage this disease. However, granular sulfur products have been observed to cause injury to the turf the season following application. This injury initially resembles dollar spot. Sprayable sulfurs are just as effective as granulars and do not have the negative side effects.

Summer patch

Formerly known as Fusarium blight, summer patch is caused by the fungus *Phialophora graminicola* and not *Fusarium roseum* and *F. tricinctum* as previously thought. This "frog-eye" disease is now called summer patch to avoid further confusion.

Summer patch is a warm weather disease occurring from late June through early September depending upon your location. The disease usually occurs after a week or two of dry weather following a heavy rain.

The characteristic initial symptom is wilted turf in the infected spot. This separates it from other diseases that have similar frog-eye symptoms.

Coring is recommended to improve root development, reduce thatch, and eliminate layering caused by two different soil types. Residential turf is often grown on poor soil.

Nutrient and water uptake are active processes which require adequate oxygen. Coring holes provide an excellent area for root growth with good aeration for proper uptake of nutrients and water.

Thatch reduction is best accomplished during the coring operation by breaking up the cores with a vertical mower or power rake. The core soil can be reincorporated into the thatch layer.

Power raking does little for thatch reduction. It removes leaf tissue which is readily broken down. Power raking does not remove the rhizomes and roots which are primarily responsible for thatch formation.

Layering results from soil of one type being placed on top of another type, as when a muck sod is placed on top of a mineral subsoil. Layering may not be a problem in the cool weather of spring and fall.

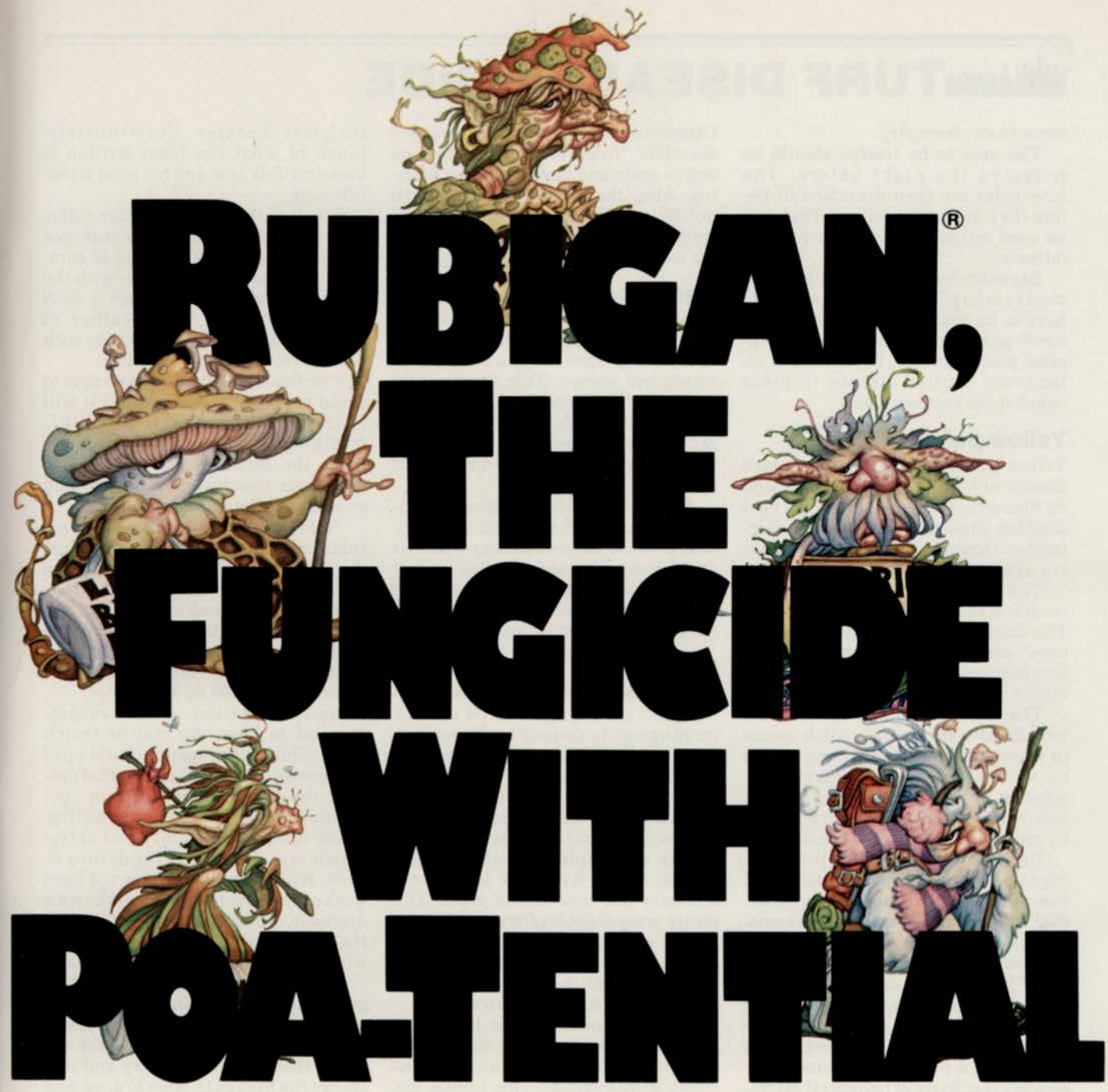
When summer conditions stress the turf, layering can be a serious problem. The entire root system is restricted to the upper layer, often no more than one inch in depth. Obviously, drought stress diseases like summer patch are going to be more severe under such conditions. Integrating the soil layers over a period of years through a coring program should create a deeper-rooted, healthier turf.

Nitrogen fertility in the summer months of June, July, and August will reduce the severity of summer patch. Approximately ½ lb. of actual nitrogen per 1,000 sq. ft. per month should be adequate.

Supplemental irrigation can culturally reduce summer patch if applied on a daily basis. Applied at midday, irrigation will cool the plants. It also provides water for the short and limited root systems of the infected plants.

If the thatch is kept moist, antagonistic microorganisms may develop, which will prevent the pathogenic fungi from attacking the plants. A daily irrigation program during the summer on infected turf may also cause the build-up of antagonistic microorganisms that destroy *P. graminicola*. Summer patch is effectively controlled by Cleary's 3336, Fungo 50, and Tersan 1991. They all have the

Pink snow mold, *or Gerlachia patch, used to be called Fusarium patch. It does not need snow cover to develop, only cool wet weather.*



RUBIGAN®, THE FUNGICIDE WITH POA-TENTIAL

Rubigan puts your fungi on the road again and sends Poa packing. With your blessing. Because while Rubigan controls dollar spot and large brown patch at low rates, at higher rates it also controls snow mold, fusarium blight, stripe smut, and gradually reduces *Poa annua*.

Have Poa your way. Keep it, or slowly phase it out. Depending on application rates, it's your choice. Gradual *Poa annua* reduction can be achieved with Rubigan and proper management techniques, or Rubigan can be used at low rates in a normal dollar spot program without affecting your *Poa annua*.

Rubigan penetrates leaves rapidly. It's not susceptible to washoff once the spray dries. And don't worry about fungi resistance due to Rubigan's multi-sites of inhibition. Rubigan also lasts longer. Longer spray intervals reduce application trips, saving you fuel and labor. Plus Rubigan gives you excellent turfgrass safety. It's as good for your turfgrass as it is devastating to your five major turf diseases.

So whether Poa is friend or foe, build your turf disease prevention program around Rubigan. **Turf products with benefits that make the difference.**

For best results always read and follow label directions. Rubigan® — (fenarimol, Elanco Products Company)
Elanco Products Company • A Division of Eli Lilly and Company • Indianapolis, IN 46285

Circle No. 112 on Reader Inquiry Card

same basic chemistry.

The area to be treated should be irrigated the night before. The fungicides are then drenched in before they dry on the foliage. They can be used either curatively or preventatively.

Bayleton does not have to be drenched in to be effective. However, it does have to be applied preventatively, before *P. graminicola* becomes active. Applied preventatively, Bayleton will effectively control disease in areas infected the previous year.

Yellow patch

Yellow patch is a newly recognized disease of Kentucky bluegrass caused by *Rhizoctonia cerealis*. This is a cool weather disease that occurs in September through November, depending upon your location.

The initial symptoms are red to purple leaves on the infected plants. The disease is characterized by "frog-eyes" which resemble summer patch. Consequently, the disease is often misidentified as summer patch.

The main differences between the two diseases are summer patch occurs in warm weather and is characterized by wilting turf in the active spots, whereas yellow patch occurs in cool weather of the fall and is characterized by red blades on infected grass plants.

Nitrogen fertility during the growing season is necessary for recovery of the older yellow patch "frog-eyes" that were formed in previous seasons. The effect nitrogen has on the development of new yellow patch "frog-eyes" has not been determined.

Some manufacturers claim their products change the chemical and biological activity of the soil and thatch to make it a better environment for biological activity of beneficial microorganisms and healthier plant growth.

Several products were tested for their management of Rhizoctonia yellow patch. One such product called Lawn Keeper promoted excellent recovery of older yellow patch "frog-eyes" and prevented new ones from forming. It is important to point out these are only preliminary findings and further research is needed to check the reliability of these results and to determine rates, timing, and the exact effect the products are having on disease organisms.

Preliminary data suggest Chipco 26019 and Rubigan will manage *Rhizoctonia* yellow patch. Effective timing and minimal rates have to be determined. It appears nitrogen application will have to be made in conjunction with the fungicide. Otherwise, fungicides may prevent the older "frog-eyes" from becoming active again and new ones from forming. Also, the older "frog-eyes" will not fill in and the maximum benefit from the fungicides treatments will not be realized.

Necrotic ring spot

Another disease that occurs in the cool weather of spring and fall is necrotic ring spot caused by *Leptosphaeria korrae*. This disease also occurs as "frog-eyes" and, like yellow patch, plants in the active spots have red blades. It appears that yellow pathe and necrotic ring spot may be part of a disease complex.

Management of this disease is similar to yellow patch management. Laboratory results indicate Rubigan, Banner and Tersan 1991 are effective against *Leptosphaeria korrae*. Field work is needed before reliable fungicide recommendations can be made.

Melting-out

This disease is often incorrectly referred to as leaf spot. To be correct, melting-out is caused by *Dreschlera poae* (formerly known as *Helminthosporium vagans*) and is a disease of Kentucky bluegrass. It occurs in the cool, wet weather of spring. The disease starts out as spots on the leaf blades and rapidly (within 2 to 3 weeks) moves down the leaf sheath and into the crowns and roots. The entire grass plant is often killed or severely damaged during the period, which is where the term melting-out arises. The entire stand of Kentucky bluegrass seems to melt away.

Leaf spot, on the other hand, is a warm weather disease of many grass species caused by the fungus *Dreschlera sorokinianum*. This fungus has also been known as *Bipolaris sorokinianum* and *Helminthosporium sativum*).

There are many Kentucky bluegrass cultivars resistant to melting-out. Merion was the first recognized Kentucky bluegrass resistant to melting-out. Some of the newer Kentucky bluegrass cultivars have some resistance to melting-out, including Parade, Cheri, Baron, and Majestic. Still, stands of some of the newer Kentucky bluegrass cultivars may be thinned by melting-out in the spring, allowing for invasion of crabgrass, quackgrass, tall fescue and/or broadleaf weeds. This means cultural practices to reduce the severity of melting-out will have to be incorporated into turf management programs.

Helminthosporium melting-out is one of the oldest, most written about, turfgrass diseases. Unfortunately, much of what has been written is based on 'folk law' and not good scientific data.

Much of the older literature refers to melting-out as having a leaf-spot stage during the hot weather of summer. Anyone who is familiar with the disease knows all the damage is done during the cool, wet weather of spring. The turf begins to recover with the arrival of warmer weather.

Practically all the literature says to avoid spring nitrogen because it will increase the severity of Helminthosporium melting-out. It appears the research that lead to the erroneous conclusion was based on greenhouse data and not field.

At Michigan State University, data from the last four years suggests just the opposite. Nitrogen in the spring actually reduces the severity of Helminthosporium melting-out. We recommend two nitrogen applications during the spring period to help manage the disease, at a rate of ½ to 1 lb. of actual N per 1,000 sq. ft.

Daily irrigation is also recommended to keep the mat or thatch moist. This encourages the build up of antagonistic microorganisms that prevent the fungus *D. poae* from sporulating, or germinating, or infecting. There is also a possibility that antagonistic organisms may even destroy *D. poae*. While the details have not been worked out, the results have shown a dramatic reduction in the amount of Helminthosporium melting-out where light daily irrigation is applied.

The actual concept may be hard to grasp, since the disease occurs in cool wet weather. But, apparently just a few days without rain allows the top of the thatch to become dry and this allows the fungus *D. poae* to grow and infect grass plants. You aren't irrigating the turf, you are irrigating the thatch to keep it moist.

Following good cultural and biological practices will help improve the disease management obtained with fungicides. There are three excellent fungicides which will help manage Helminthosporium melting-out during the 3-4 weeks it is normally a problem in the spring; iprodione (Chipco 26019), vinclozolin (Vorlan), and chlorothalonil (Daconil).

There is a possibility that anilazine (Dyrene) may also manage the disease for the desired period of time, although more research is needed. Remember, applying these fungicides with a little nitrogen will make them more effective.

continued on page 74