

## Four things to control diseases in cool-season turfgrass

**Support the turf system:  
mow, mulch, fertilize, and  
use fungicides when all  
else fails!**

by John Watkins, Ph.D.,  
University of Nebraska-Lincoln

■ Plant diseases need a host, a pathogen, and an environment that supports their growth.

Environment is the key factor. Initial disease outbreaks and, often, their severity depend on temperature, moisture and



The plot on the left received no nitrogen. Notice severe dollar spot. The plot on right received 4 pounds of nitrogen/1000 sq. ft. during the season.



Mowing wet turf infected with brown patch caused the disease to spread along the mower's path.

humidity.

- An irrigation schedule that produces alternate wetting and drying of thatch stimulates the *Helminthosporium*-type fungi that cause leaf spot and melting-out.

- Close mowing, especially during summer, creates plant stress by depleting carbohydrate reserves, which play a key role in the plant's ability to defend against and tolerate disease.

- Extensive use of landscape trees and shrubs in turf areas reduces air movement, which increases humidity and extends dew periods that favor pythium blight and brown patch.

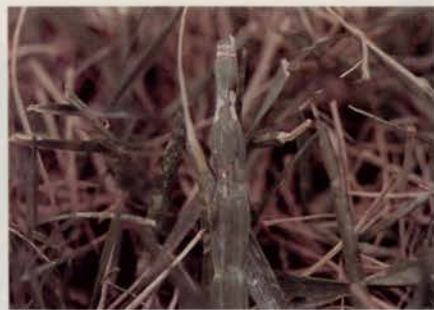
**Fertilize properly**—Kentucky bluegrass, the dominant cool-season turf in the temperate regions of North America, generally needs 2 to 4 lbs. of N/1000 sq. ft./season. Applications made in the late summer, fall and during dormancy are important when treating dollar spot, melting-out, summer patch and necrotic ring spot.

Studies at Michigan State University showed that applying 1 lb. of N per 1000 sq. ft. during each active growing month helped promote recovery of turf affected by necrotic ring spot or summer patch. Slow release nitrogen fertilizers and certain bioorganic fertilizers reduced necrotic ring spot intensity and helped promote recovery.

Probably the most critical fertilizer application is in the fall when shoot growth has stopped but roots are still actively growing.

**Mow properly**—Most cool-season turfgrasses do not like being mowed too short during the active growing season. The leaves generate energy needed for growth, reproduction and survival. Turfs mowed at 1 inch are more stressed and are more prone to disease than those mowed at 2.5 to 3 inches. Temperature is a key factor in turf pathogen activity, and the temperature is higher in a turf cut at 1 inch than in one cut at 3 inches. The taller turf has more biomass, is less dense, has better wear tolerance and has better recuperative capacity, all of which reduce its vulnerability to pathogens.

**Mulch**—Mulching recycles nutrients



A dull blade causes wounds that provide an entrance for pathogens.

and does not increase disease activity. Two key components to consider when mulching clippings are more frequent mowing and a mulching mower that chops the clippings into smaller pieces. Properly mulched clippings are used as nutrients by microorganisms that are antagonistic to pathogens. Long clippings can serve as a food base for pathogens and help pathogen mycelia move from plant to plant.

**Use fungicides**—Sometimes, no matter how hard a turf manager tries to follow good cultural practices, diseases still cause injury. Fungicides play a critical role in disease management.

Although turf managers have more than 30 different fungicides and fungicide combinations to choose from, no single fungicide product controls all major turf diseases. Products range from contact fungicides with 7- to 14-day residual activities to localized systemics and systemics that provide protection for 21 to 28 days.

In developing a fungicide program, consider which diseases present the greatest threat, which respond best to preventive treatment and which can be controlled by curative application. Some turf diseases are difficult to control once they are active. To defend against this, inspect the turf area regularly so you can detect early disease activity and make an immediate application.

—The author is an extension plant pathologist for the University of Nebraska-Lincoln.

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## Preventive and curative fungicide programs for cool-season turf diseases

Disease	Type of program	First application	Products available
Leaf spot/ melting out	P	May	chlorothalonil; iprodione; mancozeb; propiconazole; vinclozolin
Stripe smut	P	April or October	cyproconazole; fenarimol; flutolanil; propiconazole; thiophanate-methyl; triadimefon
Necrotic ring spot	P	When soil temperatures reach 60° at 2-inch depth	cyproconazole; fenarimol; iprodione; thiophanate-methyl
Fairy ring	P	At first symptoms of green ring	flutolanil
Dollar spot	P/C	June for ryegrass/ bentgrass	chlorothalonil; cyproconazole; iprodione; mancozeb; propiconazole; thiophanate- methyl; triadimefon; vinclozolin
Brown patch	P/C	June for ryegrass/ bentgrass	chlorothalonil; cyproconazole; flutolanil; iprodione; propiconazole; thiophanate- methyl; triadimefon; vinclozolin
Summer patch	P	When soil temperatures reach 65° F at 2-inch depth	cyproconazole; fenarimol; propiconazole; thiophanate-methyl; triadimefon
Pythium blight	P	June	chloroneb; ethazol; fosetyl-Al; metalaxyl; propamocarb
Rust	P	July	chlorothalonil; cyproconazole; mancozeb; propiconazole; triadimefon
Typhula blight	P	October/November	chlorothalonil; cyproconazole; fenarimol; flutolanil; iprodione; PCNB; propiconazole; triadimefon; vinclozolin
Fusarium patch	P	October/November	chlorothalonil; cyproconazole; fenarimol; iprodione; PCNB; propiconazole; thio- phanate-methyl; triadimefon; vinclozolin

P=Preventive C=Curative

*Presented for information purposes only; no endorsement is intended for products listed, nor criticism for products omitted. Check with local specialists for specific recommendations. Read and follow label instructions. Chart provides approximate timing guidelines. Preventive treatment should be considered for turfgrass with a history of disease and should not be considered a blanket treatment for all turf. Remember, a successful fungicide program is one that is integrated with cultural practices. Proper fertilization and mowing may reduce the dependency on fungicides for disease control.*

Source: Dr. Watkins

## Fertility levels influence disease activity

■ During growing months, a ratio of roughly 3-1-2 balance of nitrogen-phosphorus-potassium will usually meet the plant's demand for nutrients. When this ratio becomes imbalanced, particularly when the nitrogen component is excessively high or deficient, many turf diseases become more severe.

A study at the University of Nebraska-Lincoln showed that nitrogen levels of 6 and 8 lbs. of actual nitrogen (N) 1000 sq. ft./season caused significantly greater brown patch intensity than 4 or less pounds on a Rebel tall fescue turf. At 4 pounds of applied nitrogen, brown patch severity was intermediate and at two pounds the turf quality was acceptable although a low level of disease activity remained. Although the

turf was more vigorous at the 6- and 8-pound nitrogen rates, disease activity extended later into the season. Our findings are consistent with the objective of using tall fescue as a lower maintenance turf requiring one to three pounds of nitrogen per season. Two-thirds of the nitrogen should be applied as a dormant treatment in the fall, followed by one-third in May.

Do not fertilize tall fescue during summer because of the threat of brown patch and the promotion of excessive growth during heat stress periods.

The presence of dollar spot and to some extent, leaf or stem rust often means the turf is under-nourished. At the University of Nebraska-Lincoln, we are studying the influence of nitrogen on dol-

lar spot intensity on Penncross creeping bentgrass and crown rust severity on Manhattan perennial ryegrass.

Dollar spot was significantly less severe when the bentgrass received 4 or 6 pounds actual N/1000 sq. ft./season than at nitrogen rates of 2 pounds or less. Similar results were noted for crown rust severity on ryegrass. Crown rust was severe on plots receiving 0 or 2 pounds actual N/1000 sq. ft./season. It was moderately severe at the 4 pound rate, and rust severity was light on plots receiving 8 pounds of nitrogen. In both the dollar spot bentgrass and the crown rust-ryegrass ecosystems, the higher rates of nitrogen stimulated plant vigor, which allowed the turf to outgrow the pathogens.

—Dr. Watkins

## Warm-season control: longer growing season presents special problems

**Proper warm-season disease diagnosis is essential to effective turf care. It can't hurt your professional image, either.**

by Gary W. Simone, Ph.D.,  
University of Florida



**Helminthosporium blight on bermudagrass.**

■ Disease diagnosis on warm-season grasses offers quite a challenge to the turfgrass manager. The longer growing season allows for longer periods of disease incidence and potentially higher plant pathogen populations on established turfgrass.

When one considers the number of grass species grown and the use of overseed during the winter period, the task of disease diagnosis becomes very complex. And there are often overlaps in disease incidence periods as well as soil pathogen complexes affecting turfgrass sites.

### Common diseases

**Anthracnose**— Primarily a disease of centipedegrass, but can invade bahiagrass, bermudagrass and ryegrass. It occurs in warm, moist periods, often in sites stressed from winter damage, fertility problems, or nematodes. Control methods include stress elimination, thatch removal and fungicides if needed.

**Gray leaf spot**—More areas of intensively maintained bermudagrass are being damaged by bermudagrass decline. It also invades St. Augustinegrass, and has been associated with "patch" or decline diseases of centipedegrass, zoysiagrass and bahiagrasses. Low mowing heights, nematodes, other disease or soil insects encourage this

disease.

**Brown patch**—Perhaps the most widely-recognized turf disease, brown patch affects all warm-season grasses. This fungus is active between about 73-90 degree weather.

Brown patch is most damaging when temperatures are between 80 and 85 degrees.

Brown patch appears as three symptoms: as variably-sized spots that may span many feet in diameter; a second symptom is a "doughnut-like" ring, with healthy grass in the center. The third type is an aerial blight where tips of blades discolor as the fungus moves downward on the grass stems.

Maintain balanced fertility and avoid applications of readily available nitrogen sources during active disease.

Mow affected areas last and collect clippings if possible to avoid spreading the fungus. Dethatch turf, and apply fungicides at first sign of disease.

**Cercospora leaf spot**—Practically identical to grey leaf spot in appearance and timing. Initial spots are very small, and dark brown-to-purple in color.

As lesions mature, they turn tan in color, enlarge and can cause leaves to yellow, wither and die. Affected turf appears to thin. Yellow-green (common) selections

of St. Augustinegrass appear more susceptible than bitter-blue selections.

Avoid frequent, shallow watering.

**Cottony blight**—Considered a disease of cool-season grasses, this disease can be quite damaging on overseeded bentgrass/ryegrass and on bermudagrass. It thrives in a broad temperature range (68 to 95 degrees). Poor air circulation and poor drainage favor development.



Scattered, chlorotic fascicles are still alive in root rot (St. Augustinegrass).

Avoid maintenance while turf is wet, and avoid frequent irrigations.

**Dollar spot**—Occurs in all warm-season grasses, especially bermudagrass, bahiagrass and zoysiagrass, and grasses used for overseeding.

Favored in temperatures between 60 and 80 degrees, but warmer weather strains have been observed in Florida.

Free moisture from fog, dew or irrigation triggers disease development in sites with low nitrogen and potassium levels and ample thatch.

Affected areas range in size from one to two inches in finer grasses, to six to eight inches in coarser varieties.

Time irrigations for early in the day, and water deep when needed. Minimize thatch and fertility imbalances for long-term control.

**Fairy ring**—Caused by a variety of mushroom and puffball-type fungi. Occurs in any site where organic matter is an abundant food source. Fungi often produce a variety of irregularly-sized arcs or circles on turf sites. Fairy ring control

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# STEP ON IT

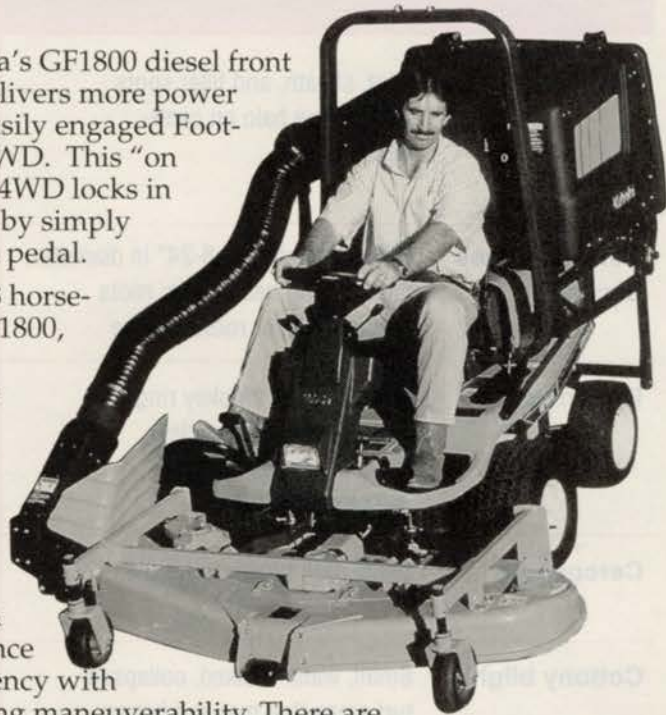
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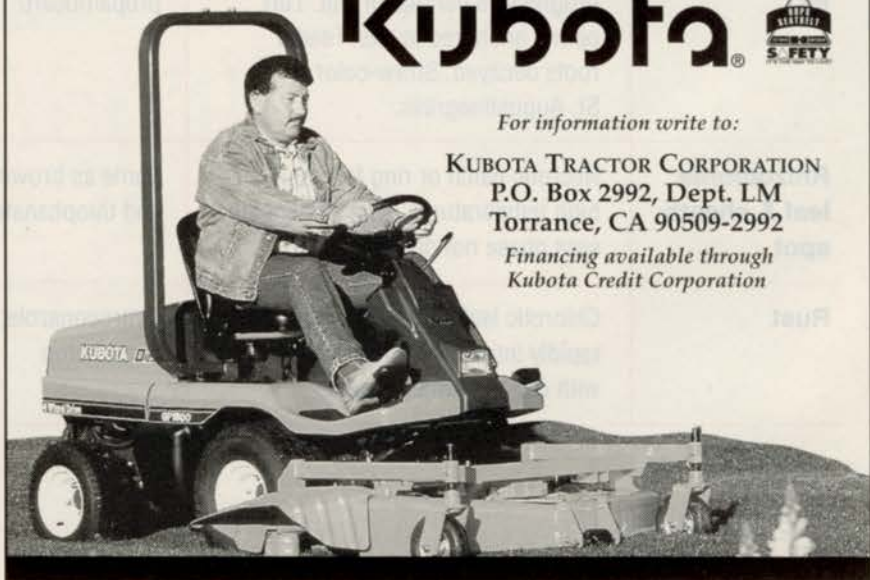


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## Warm-season disease diagnosis and control

Disease	Damage	Common fungicides
<b>Anthracnose</b>	Leaf, sheath, and tiller spots with yellow halo on centi-pedegrass	chlorothalonil; chlorothalonil + fenarimol; fenarimol; cyproconazole; mancozeb + thiophanatemethyl; propiconazole; thiophanate methyl; triadimefon
<b>Bermudagrass decline</b>	Chlorotic patches, 8-24" in diameter; thins during heat spells; roots shorten, feeder roots decline	fenarimol; propiconazole; thiophanate methyl; triadimefon
<b>Brown patch</b>	Round patch, smokey ring or aerial blight; fascicles rot at the base, with dark discoloration at base.	benomyl; chlorothalonil; chlorothalonil + fenarimol; cyproconazole; fenarimol; flutolanil; iprodione; mancozeb; maneb; pentachloronitrobenzene (PCNB); propiconazole; thiophanate methyl; thiram; triadimefon
<b>Cercospora</b>	Small dark brown to purple	benomyl; chlorothalonil; mancozeb; maneb; thiophanate methyl
<b>Cottony blight</b>	Small, water-soaked, collapsed turf areas that mat and brown quickly. Disease spreads in the direction of traffic or surface water runoff.	chloroneb; etridiazole; fosetyl aluminum; metalaxyl; propamocarb
<b>Dollar spot</b>	Small spots one to eight inches in diameter wilt and bleach to a straw color.	benomyl; chlorothalonil; chlorothalonil + fenarimol; cyproconazole; fenarimol; iprodione; mancozeb; mancozeb + thiophanate methyl; pentachloronitrobenzene (PCNB); propiconazole; vinclozolin
<b>Pythium root rot</b>	Gradual thinning, browning with progressive periods of wilt. Turf poorly anchored in site. Feeder roots decayed. Straw-color in St. Augustinegrass.	chloroneb; etridiazole; fosetyl aluminum; metalaxyl; propamocarb
<b>Rhizoctonia leaf &amp; sheath spot</b>	Necrotic patch or ring forms under high temperatures; Leaf and sheath spot phase not distinctive.	Same as brown patch. Avoid using benomyl and thiophanate methyl.
<b>Rust</b>	Chlorotic leaf flecks that enlarge rapidly into linear pustules filled with red-to orange spores.	Cyproconazole; mancozeb; maneb; propiconazole; triadimefon

Source: Dr. Gary W. Simone

**WARM DISEASE** from page 45

involves:

□ Tolerance: it is primarily a cosmetic disease.

□ Cleanup of the mushrooms when formed since some are toxic and represent liability situations.

□ Camouflage symptoms through nitrogen fertilization for the rest of the turf and/or water for the browned-out fairy ring sites.

Flutolanil (ProStar) is a newer fungicide being used to suppress the reproductive stage of these fungi.

**Gray leaf spot**—This is the primary scourge of St. Augustinegrass. The disease is favored by the hot, moist summer months, especially on turf sites with poor air circulation, low light, frequent light irrigation and high available nitrogen levels.

Grass cultivars derived from the bitter-blue types are more susceptible. Symptoms begin as small brown spots on leaves, sheaths and stems. These enlarge to brown-to-ash colored lesions with dark brown to maroon margins.

Repeated fungicide applications are

### Detection tips

- ✓ Inspect turf daily, in early-morning hours (especially after dew, rain or nighttime irrigation) are critical for perceiving physical signs of certain fungal pathogens like *Pythium* or the *Sclerotinia* complex.
- ✓ When you spot trouble, inspect the turf areas for the type of damage. Notice which part of the grass is affected, and how is the disease distributed.
- ✓ Use your knowledge of the fertility, irrigation and pesticide programs at each site, weather information and photographs prior to diagnosis and treatment.
- ✓ Have a three- to four-inch turf sample analyzed before applying control products. This sample can usually be analyzed within a calendar week, before the need arises for a second fungicide treatment.

—Dr. Simone

often needed during hot, moist months of summer. Irrigate deeply and only when needed early in the day to break influence the disease cycle.

**Helminthosporium spots**—Disease is favored by low fertility and thatch and disease spread is favored by frequent irrigations. Symptoms include leaf spots and a general melting out syndrome. Lesions are more numerous near the base of leaves and the crown of the plant. Manage thatch, provide balanced fertility, avoid frequent irrigations and use fungicides as needed.

**Pythium root rot**—Thrives in poor drainage.

Symptoms are thinning or browning out of turf, with progressive wilt as a result of feeder root decay. Grass pulls up easily. Roots are discolored, soft-decayed, with few feeder roots.

St. Augustinegrass often turns straw-colored as a result of root rot.

—The author is an extension plant pathologist and associate professor at the University of Florida.



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