

WARM-SEASON TURF DISEASES

It can be very difficult to tell one turf disease from another. But proper identification is a necessity before treating with a fungicide.

by Robert Haygood, Ph.D. and Walker Miller, Ph.D.

What is causing the dead areas in turf? is a frequent question landscape professionals must address. It is also one of the most difficult questions to completely and accurately answer because of the many potential factors involved.

Diseases, insects, environmental stress and improper cultural practices are frequent causes.

Fungi, viruses and nematodes can cause serious problems on all warm-season turf species. Environments that favor disease can result in devastated swards virtually overnight. Knowing causal agents, environments favorable for infection and spread, and susceptibility of turf species makes diagnosis more accurate.

Adopting good horticultural practices helps avoid predisposition to disease. Even the healthiest turf often needs pesticide applications to protect it from pathogenic microorganisms. The target pest must be identified so an effective pesticide can be selected. For example, several fungicides are effective for brown patch, but not for pythium blight.

Here are some new developments



Fairy rings are irregular sized circular or semi-circular bands of lush green turf.

in disease diagnosis and control for warm-season areas of the country:

Brown patch

Rhizoctonia species can cause circular

patches and/or leaf spots on many turfgrass species, depending on fungal species and micro-environment. Brown patch, the single name for all diseases caused by Rhizoctonia species, occurs frequently on all warm-season grasses.

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The subgroup of *Rhizoctonia solani* that rots the sheaths and stolons of St. Augustinegrass can attack centipede grass in the same manner.

Rhizoctonia solani is the most frequent disease of warm-season turf. This fungus generally causes circular patches under warm, moist conditions. St. Augustinegrass and zoysiagrass have traditionally been considered more susceptible than centipedegrass or Bermudagrass. Research at Clemson University notes that brown patch is a more serious problem on centipedegrass than previously recognized.

Rhizoctonia solani is composed of several identifiable sub-groups. The same subgroup that rots the sheaths of St. Augustinegrass can attack centipedegrass in the same manner. The most characteristic symptom of brown patch is the presence of soft and subsequently necrotic basal sheaths.

Sheath rot caused by *R. solani* is most severe when temperatures are 75°F to 85°F in moist conditions. Temperatures favorable for activity of *R. cerealis*, range from 55°F to 70°F.

Rhizoctonia oryzae and *R. zeae* are referred to as hot weather species since they can attack turf when temperatures are as high as 92°F. These two species have the capability of causing sheath rot of centipedegrass and St. Augustinegrass.

Brown patch can occur any time of year. In South Carolina and areas with similar climates, brown patch is often most severe on warm-season turfs in the spring and fall. This is especially true on centipedegrass and St. Augustinegrass.

Occurrence of brown patch can be reduced by adopting good horticultural practices. Excessive fertilizer application and thatch accumulation favor disease development. Watering late in the afternoon or at night should be avoided. Fungicides effective for brown patch control are noted in Table 1.

St. Augustine decline

A strain of panicum mosaic virus (PMV), known as St. Augustine decline (SAD), causes light green to yellow spots and blotches on leaf blades of St. Augustinegrass. Infected turf is stunted, declines and often dies within three years. The disease has been reported in Texas, Arkansas, Louisiana, Mississippi and South Carolina.

A strain of PMV can affect centipedegrass. It causes foliar symptoms similar to those on St. Augustinegrass. Research is being done at Clemson University to characterize the disease.

No chemicals are available for control of SAD or other virus diseases.

Floratam, Seville and Raleigh are varieties of St. Augustinegrass which have proven to be resistant to strains of PMV detected thus far. These varieties or a non-susceptible turfgrass species should be selected where SAD has caused problems in the past. Chinch bug resistance, cold hardness, shade tolerance and other factors of concern should be integrated into the selection process.

Spring dead spot

SDS occurs as circular dead areas of Bermudagrass from six inches to several feet in diameter. The spots show up as the grass greens up in the spring. Roots and stolons in affected spots are dark and rotted. During summer, the spots gradually recover from stolons running in from the outside. Weeds are a problem while spots are recovering. Despite good management, spots still appear as weak areas in the turf. In the fall, spots can be observed in tall mowed Bermuda as shorter growing areas that remain green longer than other areas. In close mowed Bermuda, there are no symptoms.

If you have had problems with SDS in the past you may well continue to have problems. Generally the spots re-occur in the same spot each year, gradually getting larger, coalescing into irregular areas.

Another good indicator is your location. If you are anywhere from the northern limit of where Bermudagrass is grown to where the average daily temperature for November is 55°F, SDS is likely. In South Carolina, the disease commonly occurs north of a line that runs from the North Carolina border through Sumpter, S.C. and Augusta, Ga. The frequency is low south and east of that line.

Recent research has discovered that *Leptosphaeria korrae* causes the disease in the U.S. This is a breakthrough in SDS research. It will greatly facilitate further improvements in control and management.

Previously, only certain states had special labeling for fungicides for SDS control covering benomyl and PCNB. Two new products are now labeled for SDS, Rubigan and Banner, though the Banner label is

limited to California use only.

Dollar spot

The symptoms of dollar spot (*Sclerotinia homeocarpa*) vary, depending on mowing height. In closely mowed bentgrass and Bermudagrass, one- to three-inch straw-colored spots occur. On tall or coarse grasses like zoysia and fescue, it could be confused with brown patch except for leaf lesions which are diagnostic. Straw-colored lesions move in from the leaf margin resulting in distinct bands across the leaf. Once the band is completely across the leaf, the distal portion of the leaf collapses. The disease occurs mostly in the mild temperatures of spring and fall in South Carolina. Signs, actual mycelium of the fungus, are often visible before the dew dries in the early morning. Do not confuse these signs with Pythium, since choice of fungicides is vastly different.

The turf should be managed to avoid nitrogen deficiency. Excess nitrogen can contribute to developing brown patch and other turf problems. The irrigation schedule should avoid prolonging the leaf wetness period.

Thatch management is another important aspect of the dollar spot control program. High thatch levels contribute to disease. Some excellent fungicides for dollar spot control are noted in Table 1.

Melting out

Melting out (*Bipolaris* and *Drechslera* species) is sometimes known by the old name of the fungus genus which causes the disease, *Helminthosporium*. Melting out is a complex of many different species. Each species is favored by different environmental conditions and is more prevalent on one host than another.

The disease is very destructive during wet humid weather. Melting out can be a real problem on Bermuda and zoysiagrass but occurs on bentgrass, fescue and ryegrass in the Southeast.

Small dark brown, purplish or purplish-red spots appear on the leaf blades or sheaths in the spring. If conditions favorable for disease persist, the leaf spot phase can result in coalescing lesions, blighted leaf blades and above-ground portion of the plant.

The melting out phase appears in warm to hot weather as a reddish brown decay of the crown, stolon, rhizome and root tissues. These turn chocolate-brown to black as they are invaded by other fungi and bacteria. The feeding roots of such plants are shallow and few. The turf can wilt in midday even with adequate moisture.

Cultural tactics include proper mowing height, collecting clippings in intensively managed turf, avoiding dense thatch, maintaining a balanced fertility program, watering adequately, improving soil drainage and promoting good drying conditions. If cultural practices are not adequate, then fungicides may be needed on a preventive basis.

If a few applications of fungicide are going to be applied, they are best applied in the spring to prevent the disease's buildup. Once the disease builds to epidemic proportions, it is very difficult to bring it

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Table 1.

TURFGRASS DISEASE CONTROL.

Read and follow label directions closely

Fungicide*	Product Rate/1,000 sq ft	Fungicide*	Product Rate/1,000 sq ft
Brown Patch			
anilazine 50WP	4-8 oz	iprodione 50WP	1.5-2 oz
benomyl 50WP	2 oz	maneb 80WP	3-8 oz
chlorothalonil 75WP	2-8 oz	mancozeb 37%	5-14 fl oz
chlorothalonil 29.6%	8-12 fl oz	mancozeb 80WP	4 oz
chlorothalonil 40.4%	3-11 fl oz	PCNB 75WP	3-16 oz
triadimefon 25WP	1-2 oz	10G	2-7.5 lb
propiconazole	1-2 fl oz	thiophanate 50WP	1-2 oz
fenarimol 50WP	.4-8 oz	thiophante-methyl 50WP	2 oz
Dollar Spot			
anilazine 50WP	4-8 oz	fenarimol 50WP	2-4 oz
benomyl 50WP	1 oz	iprodione 50WP	1.5-2 oz
chlorothalonil 75WP	2-8 oz	maneb 80WP	6-8 oz
chlorothalonil 29.6%	8-12 fl oz	mancozeb 37%	10-14 fl oz
chlorothalonil 40.4%	3-11 fl oz	mancozeb 80WP	6-8 oz
triadimefon 25WP	1-2 oz	thiophanate 50WP	1-2 oz
vinclozolin 50WP	2 oz	thiophanate-methyl 50WP	1-2 oz
Melting out, Helminthosporium Leaf Spot			
anilazine 50WP	4-6 oz	iprodione 50WP	1.5-2 oz
chlorothalonil 75WP	2-8 oz	maneb 80WP	3-8 oz
chlorothalonil 29.6%	8-12 fl oz	mancozeb 80WP	4 oz
chlorothalonil 40.4%	3-11 fl oz	mancozeb 37%	5-14 fl oz
Pythium Blight			
chloroneb 65WP	4 oz	metalaxyl 2E	1-2 fl oz
etrizazole 30WP	2-8 oz	propamocarb 6E	1.33-4 fl oz
Rust			
anilazine 50WP	4-8 oz	maneb 80WP	3-8 oz
propiconazole	1-2 fl oz	mancozeb 37%	5-7 fl oz
triadimefon 25WP	1-2 oz	mancozeb 80WP	4 oz
Fairy Ring			
Vapam			
see label for detailed instructions			
Powdery Mildew			
triadimefon 25WP	1-2 oz	propiconazole	1-2 fl oz
Gray Leaf Spot			
chlorothalonil 75WP	2-8 oz		
chlorothalonil 29.6%	8-12 fl oz		
chlorothalonil 40.4%	3-11 fl oz		
Slime Mold			
None recommended.			
Easily controlled by cultural methods.			
Spring Dead Spot			
fenarimol 50w	1-2 oz	propiconazole (calif only)	1-2 fl oz
St. Augustine Downy Mildew			
metalaxyl	see label		
Anthracnose			
propiconazole	1-2 oz	trindimefon 25WP	2 oz

*Current recommendations of Clemson University Cooperative Extension Service. The mention of a product is not an endorsement, and discrimination by the Clemson University Cooperative Extension Service is not implied by the exclusion of any comparable product. Each specific label is the final authority on application rates and uses.

back under control. Once this situation develops, the turf manager will need to fertilize to promote growth, and frequent applications of fungicides will be necessary at five- to seven-day intervals. Thorough coverage is an important aspect of melting out control.

Pythium blight

Pythium blight is caused by species of the fungus *Pythium*. It is especially severe on overseeded ryegrass and during establishment of other cool-season grasses in the Southeast. During warm wet weather, outbreaks of disease may result in complete destruction of stands within 24 hours from the first evidence of symptoms.

The disease appears as small irregularly-shaped spots 1/2 to 4 inches or so in diameter. At first they are water-soaked in appearance, fading to light brown as they dry out. Individual diseased leaves are at first water-soaked, soft, even slimy. When stepped on, they mat together. After a period of dew and while the humidity is still high, white "cobwebby"-like growth may be visible.

This fungus lives during dry periods as a soil inhabitant. High levels of nitrogen fertility and low levels of calcium favor disease. High pH (above 7) also favors disease. The use of benzimidazole fungicides can increase the disease's severity. Adequate calcium levels should be maintained and alkaline pHs avoided. When conditions favor disease, fungicide sprays are required. Seed treated with an effective fungicide such as Apron or Koban per label directions will help prevent the disease during establishment.

Gray leaf spot

The fungus *Pyricularia grisea* causes round to oblong leaf spots on St. Augustinegrass that are brown, tan or ash-colored in the center with purple or reddish-brown margins. Severely-affected turfgrass may have a scorched appearance.

Avoid excessive nitrogen and conditions that would extend dews during the warm part of the year. This disease occurs during warm, rainy periods in the summer. In intensively-managed situations, a fungicide may be necessary.

Rusts

Different rusts attack different turfgrass species. Most are in the genus *Puccinia*, but there is a different species for each type of grass—and sometimes for each variety of grass.

Seldom are rust infections severe enough to cause serious damage. Meyer and Emerald zoysias and some ryegrasses are the most likely to be affected severely enough to warrant spraying. Available fungicides are listed in Table 1. Several of the newer fungicides in the ergosterol inhibiting group are super-effective.

Cultural control consists of fertilizing to stimulate growth, mowing frequently and catching clippings to reduce inoculum. Ryegrasses resistant to rust should be selected.

Anthracnose and curvularia

Using cool-season grasses in the Southeast for intensively managed turf such as

Table 2.

TRADE NAMES FOR THE COMMON TURF FUNGICIDES

Common Name	Trade Name*
anilazine	Dyrene
benomyl	Tersan 1991, Benlate
chloroneb	Terraneb SP
chlorothalonil	Daconil 2787
etridiazole	Koban, Terrazole
fenarimol	Rubigan
iprodione	Chipco 26019
maneb	Dithane M-22 Special
mancozeb	Fore, Tersan LSR, Dithane M-45, Manzate 200 Flowable, Penncozeb
metalaxyl	Subdue
PCNB	Terraclor, Turfcide
propiconazole	Banner
propamocarb	Banol
thiophanate	Cleary's 3336
thiophanate-methyl	Fungo 50
triadimefon	Bayleton
vinclozolin	Vorlan

*The mention of a product does not constitute a recommendation or an endorsement, and discrimination by the Clemson University Cooperative Extension Service is not implied by the exclusion of any comparable product. Each specific label is the final authority on application rates and uses.

bentgrass greens has resulted in problems with anthracnose (*Collectotrichum graminicola*). It occurs during the peak of hot weather when cool-season grasses are barely growing. Under this situation the organism has time enough to build up to damaging levels. Normally any infections that take place are mown away.

Cooling the turf with sprinkling will set the grass up for other diseases. The only recourse is to spray when disease pressure is high. The new product, Banner, an ergosterol inhibitor, is labeled for control, but it may not be used on home lawns. It has systemic properties which should mean less spraying.

Curvularia is another weak pathogen that is widespread in the Southeast. On turf under extreme environmental stress during hot weather, the fungus can contribute to decline. Under such conditions, protective fungicides appear to help.

St. Augustine downy mildew

This disease is limited to the southern extremes of the U.S. It is characterized by white raised linear streaks in the leaf blade. The disease is apparently severe in poorly drained areas. The fungicide metalaxyl (Subdue) is labeled for control.

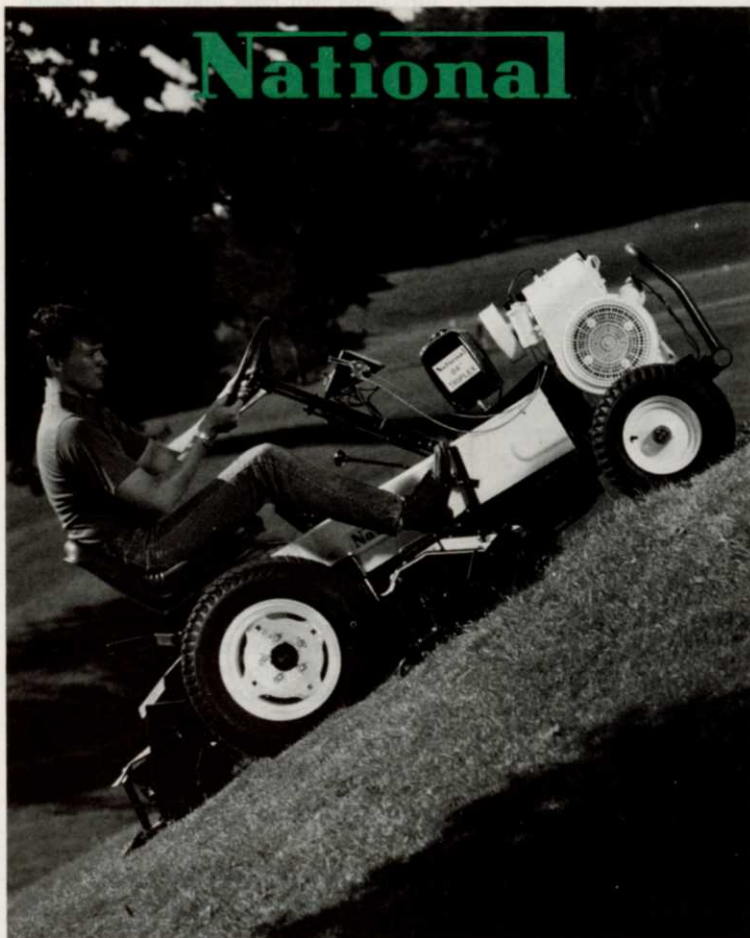
Powdery mildew

Rarely is this disease a serious problem. The fungus *Erysiphe graminis* is seen as white powdery growth over the surface of

leaf blades. In the Southeast, it has been observed on Bermuda, bluegrass and fescue in the summer. Powdery mildew is a dry-weather disease. It does not require free water for infection. Several fungicides in Table 1 will give very good control.

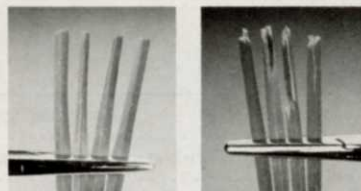
Fairy rings

Irregular-sized circular to semi-circular bands of lush green turf often occur. Turf on either side of the infected area may thin and decline. The rings can persist for years, increasing in size annually. **LM**



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Fairy rings are caused by soil-inhabiting fungi which commonly produce mushrooms. They decompose organic matter and either stimulate, cause death of or compete with grass for water and other resources.

Fairy rings are difficult to control and are very common. Tactics include water-soaking the area with a hydro gun regularly; fertilizing to mask the symptom of the dark ring; using herbicides to prevent weed invasion till the grass can recover; completely removing the infested area; and fumigation followed by replanting. In most situations, applying fertilizers and herbicides as an integrated practice is considered most practical.

Slime molds

Bluish-gray encrustations on leaf blades are most common. Some slime molds look like vomit or creatures from outer space. Hence they can cause a lot of excitement.

They, however, are not pathogens. The only problem they could cause would be creating too much shade for the leaf blades. They are a biological indicator of persistent dews and hence a warning that disease problems could develop. They do not warrant a control program. Many fungicides applied for other reasons will inhibit their development.

Nematodes

Parasitic nematodes are microscopic worms that attack the root system. Injured,

poorly developed roots result. Affected turf tends to wilt easily, responds poorly to fertilizer, and appears thin or declining.

If nematodes are suspected, soil should be analyzed. Take 10 to 20 soil subsamples about six inches deep with a soil probe. Mix them together in a plastic bag. Protect the sample from extremes in temperature and rough treatment. Deliver this bag to your local extension service or private laboratory for analysis and interpretation. Be sure to tell them what the grass host is or will be.

If nematodes are the problem, your options are limited. Adapting the best cultural practices available will enable the turf species to better withstand injury from high nematode populations. Mocap,

Nemacur and Dasanit are labeled under certain situations, as noted in Table 3. Check with your cooperative extension service to see what chemicals are effective for the nematode of concern.

A new product has just hit the market for nematode control. It is called Clandosan. At this point, we do not know enough about this product to recommend it in South Carolina. If you use it, we suggest you monitor your results by sampling regularly from both a treated area and non-treated area. This material contains nitrogen, so be careful not to confuse a nitrogen response as control. Actually, your non-treated area should receive the same amount of nitrogen as in the Clandosan-treated area. **LM**

Table 3.

NEMATODE CONTROL IN TURF

Crop	Nematicide	Rate/1,000 sq ft
Commercial turf only, except Mocap 10G which is also labeled for use on residential turf by commercial pesticide applicators.	R Dasanit 15G	1 ½-3 lb
	R Mocap 10G	5-7 lb
	R Nemacur 10G	2 ⅓-4 ⅔ lb

REMARKS: For use only by certified commercial applicators. Commercial turf includes golf courses, cemeteries, sod farms, and industrial grounds. Follow manufacturer's directions carefully! R-Some or all uses of this product are restricted.

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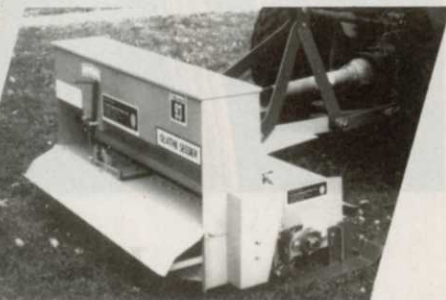
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