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Don't Get Caught with Dead Patches of Grass Next Spring - Warm-season Turfgrass Fungicide Treatments for the Fall

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As the fall approaches and the weather becomes cool, most people are turning their attention toward college football highlights on Saturdays and away from managing a few diseases of warm-season turfgrasses. Turfgrass managers and homeowners alike should take some time this fall to decide if they are to treat warm-season turfgrasses for two major diseases, spring dead spot and large patch, which typically appear in the spring.

Spring dead spot

Spring dead spot (SDS) is a common disease of bermudagrass but rarely of buffalograss or zoysiagrass in Oklahoma. Spring dead spot primarily occurs in highly managed residential, commercial, and recreational bermudagrass lawns. Lawns that are seldom fertilized, irrigated, or receive herbicide treatments are less likely to develop severe levels of SDS. In Oklahoma, SDS is most noticeable in spring as bermudagrass breaks dormancy and into the early summer. New symptoms of SDS do not appear in growing stands of bermudagrass in mid-to-late summer or fall in Oklahoma.

Affected areas may range from inches to many yards in length or diameter (Fig. 1). The turf in affected areas will be dead and tan-brown in color (Fig. 1). Large circular, semi-circular, or arcs of dead turf will be apparent. Patches are perennial, typically expand in size and often can reach several yards in diameter. Affected plant parts, such as rhizomes, crowns, roots or stolons are dark black and rotted when removed from the soil. As the patches expand and more dead area develops, weed growth within the patches during spring and summer months is common and may require the use of pre- or post- emergent herbicides.

Two fungi, Ophiosphaerella herpotricha and Ophiosphaerella korrae are the principal causal agents of spring dead spot in Oklahoma. Ophiosphaerella herpotricha is found throughout the state while O. korrae has primarily been found in the eastern portion of the state. Infection of

the turf begins when soil temperatures are mild (<70°F). In Oklahoma, infection of susceptible grasses begins in late September and will continue as long as soil temperatures are above 50° F. Fungal growth and plant infection resumes in early spring, may slow growth of plants, and will eventually subside once soil temperatures climb above 75°F. Turfgrass grown under high nitrogen fertility or that receive late-season applications of nitrogen to extend green color, are more prone to the development of SDS.



Fig 1. Spring dead spot symptoms on a golf course fairway planted with bermudagrass.

Spring Dead Spot Management: Balanced soil fertility programs in early summer will increase the speed of recovery and aid bermudagrass in outcompeting weed encroachment (See fact sheet HLA-6420). Avoid late season applications of nitrogen fertilizers. It is generally recommended to not fertilize after September 15th in Oklahoma. For small lawns and when patches are identified before they are large, symptomatic areas can be dug and the soil and plant material removed in and around the dead area. Few effective fungicides are available for the homeowner to use for spring dead spot control. However, fungicides are available to commercial turfgrass maintenance operators for SDS control. Fungicides in the Fungicide Resistance Action Group (FRAC) 3 (e.g. demethylation inhibitors or DMIs) should be applied in the fall before soil temperatures drop to 70°F for chemical control to be effective. A second fungicide application 28-30 days later will result in better control than a single fall application. Some fungicides and their relative efficacy on spring dead spot, which have been evaluated in trials at Oklahoma State University, are included in Table 1. It is highly recommended that the

affected areas are photographed or otherwise mapped in the spring and that fall fungicide applications are targeted to only those areas where the disease was present. Recent research has indicated a single spring application is generally not effective, while a single spring plus a single fall application is as effective as two fall applications. Research has document that fungicides mostly provide suppression of disease symptoms and complete control is often not achievable.

Table 1. Relative performance of select fungicides for controlling spring dead spot of bermudagrass.

Fungicide (Trade Name)	Performance ^A	
Propiconazole (Banner Maxx)	4	
Fenarimol (Rubigan)	4	
Myclobutanil (Eagle)	4	
Triticonazole (Trinity, Triton Flo)	2	
Chlorothalonil (Daconil)	1	
Azoxystrobin (Heritage)	1	

APerformance is based on a scale of 1 - 4 where 1 = not effective, 2 = little to no control, 3 = some control, 4 = fairly good control.

Large patch

Large patch is an occasional disease of warm-season turfgrasses in Oklahoma. The disease can occur in residential, landscape, and recreational warm-season turfgrasses. In Oklahoma, the disease is most noticeable in early spring when turfgrasses are breaking dormancy and weather conditions are wet and mild. In some years, the disease is evident in the fall; however, activity by the pathogen may not always result in visible symptoms.

The turf in affected areas will thin and individual grass leaves may appear bleached or yellow (Fig. 2). Large circular, semi-circular, or arcs of damaged turf will be apparent. When the disease is active, the interface between healthy and diseased turf may appear bright orange (Fig. 2). This is often most apparent on zoysiagrass. Leaf lesions, a white, cottony growth (mycelium) and smoke rings at the edge of the diseased areas will be absent. Patches are perennial, typically expand in size and often can reach several yards in diameter. Affected shoots can be easily pulled from sheaths or point of attachment and the base of the shoot may appear water soaked. As plant stand density is reduced, weed encroachment is common both during and after disease activity.

The fungus that causes large patch, *Rhizoctonia solani*, overwinters as dormant mycelium (body of the fungus) in infected plants or as special survival structures. Epidemics are typically initiated when temperatures are mild and prolonged periods of high humidity exist. In Oklahoma, infection of susceptible grasses can begin in late September when soil temperatures are above 50°F and moisture is adequate and continue until dormancy. Fungal activity can resume in early spring but is suppressed by soil temperatures greater than 85°F. Turfgrass grown under high nitrogen fertility that is applied too late in the year or very early in the spring

is more prone to the development of large patch. Turfgrass that is also excessively irrigated, has abundant thatch, or low air movement above the canopy can be predisposed to disease. Extended periods of wet, mild weather can lead to severe epidemics. During summer months the disease subsides and the fungus typically survives in thatch or in resting structures.



Fig 2. Symptoms of large patch of bermudagrass.

Large patch management: Large patch usually does not kill the stolons or rhizomes and surviving plants can fill in the affected areas during summer months. Do not apply nitrogen fertilizers in early spring when the pathogen is active; wait until soil temperatures are warmer. Do not apply nitrogen after September 15th. When water is required, apply a sufficient amount to wet the soil and then water as infrequently as possible without causing drought stress between irrigation events. Wait and remove excessive thatch or aerify in the summer; these activities may help reduce disease severity. Few effective fungicides are available over the counter for the homeowner to use for large patch management. However, effective fungicides are available to the professional turfgrass management community for large patch control. For chemical control to be effective, fungicides should be applied in the fall before disease development is evident. A repeated fungicide application 30 days later may be required if environmental conditions are still conducive for disease. It is recommended that the affected areas are photographed in the spring and that fall fungicide applications are targeted to only those areas where the disease was present. Spring applications are generally not effective.

Research at the Oklahoma State University Turfgrass Research Center identified several effective fungicides for controlling large patch of Zoysiagrass (cultivar = 'Meyer'). All treatments were first applied at label rates on September 26, 2008. A second treatment of the same fungicide and rate was applied 28 days later on October 24, 2008. Evaluations of large patch disease and also overall quality were evaluated on May 15, 2009. All fungicides controlled large patch better than not treating (Table 2). However, no one fungicide was statistically better than another. Numerically triadimefon (Bayleton) was the best performing product; but registration for application on home lawns has been removed. Overall turfgrass quality was acceptable for all fungicide treated plots. Plots not treated with fungicide were considered visually unacceptable. Fluoxastrobin (Disarm), Flutolanil (Prostar), and Triadimefon (Bayleton) resulted in the highest overall turfgrass quality and lowest levels of disease.

Table 2. Relative performance of select fungicides for controlling large patch of Zoysiagrass.

Fungicide Active Ingredient (Formulation Used)	Average Diseased Area (%) ^A	Overall Turfgrass Quality (1-9 scale) ^B
Non-treated	47.5 A	4.0 C
Propiconazole (Banner Maxx)	13.7 B	7.0 B
Pyraclostrobin (Insignia)	4.9 B	7.7 AB
Azoxystrobin (Heritage)	1.8 B	7.5 AB
Fluoxastrobin (Disarm)	1.3 B	8.5 A
Flutolanil (Prostar)	0.6 B	8.5 A
Triadimefon (Bayleton)	0.0 B	8.7 A

A Letters next to numbers within the same column, indicate that those numbers are not statistically different.

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^B Turfgrass quality is based on a scale of 1 - 9 where 1 = no turf present, 5 = unacceptable turfgrass, 7 = acceptable turf, 9 = dense, dark color, thick stand of turfgrass. Letters next to numbers within the same column, indicate that those numbers are not statistically different.