

Grass Management

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To:jimbeckstrand57@gmail.com <jimbeckstrand57@gmail.com>

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Necrotic Ring Spot and Summer Patch of Turfgrass.pdf;

Hi Jim,

Here is what you need to know for management of grass at the cemetery.

Number one thing for fungal and bacterial issues would be to aerate each year. This helps improve soil compaction and lessens the chance for problems. You should also set the mower height to about 3 inches, it is a longer grass, you can still cut it shorter for holidays to improve the look but the longer grass will help. Lastly is using a slow release fertilizer, too much too quick in the spring can jumpstart issues in the lawn. Use a sulfur coated nitrogen if possible.

This link shows an overview of turf issues in Utah, you had some bacterial blight and some summer patch.

https://extension.usu.edu/planthealth/ipm/notes_orc/list-turf/common-turf-diseases

I am also attaching a page with more information on necrotic ring spot and summer patch. On the attachment the management section and prevention section will be the most help. It lists some of the practices I mentioned and also some varieties that are more resistant to consider when overseeding problem areas.



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Necrotic Ring Spot and Summer Patch of Turfgrass

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What you should know

- Necrotic ring spot and summer patch are two fungal diseases with similar above ground symptoms.
- Both pathogens mainly affect the root system and stolons of Kentucky bluegrass, annual bluegrass and tall fescue.
- To distinguish between the two diseases a microscopic analysis is necessary.
- Management of NRS and SP is difficult and requires an integrated approach utilizing cultural, chemical and varietal control measures.

INTRODUCTION

Necrotic ring spot (NRS) (*Ophiosphaerella korrae*) and summer patch (SP) (*Magnaporthe poae*) infect cool-season grasses, particularly Kentucky bluegrass. The pathogens are damaging because they infect and kill turfgrass crowns and roots, resulting in slow recovery. The pathogens belong to a larger group that cause "patch" diseases in turfgrasses, although they are not taxonomically related. A patch is characterized by the blighted appearance of turf in a section of otherwise healthy turf. Patch diseases are difficult to diagnose in the field because some of the symptoms can also be caused by a variety of other stresses. For example, stress caused by poor or extreme soil moisture, or improper mowing will result in brown turfgrass in irregular shaped patches; as will repeated urination by dogs on the same spot. Diagnosis can also be difficult because of the similarity of individual symptoms between different pathogens.

SYMPTOMS

Initial symptoms for NRS are small light green spots on the lawn that can be easily overlooked (Fig. 1). The first symptoms for SP consist of small areas of the lawn with poor growth, and wilted grass blades. As both diseases advance enlarging brown patches of turf will be visible that can range in size from 1-3 ft. in diameter. NRS usually occurs earlier in the season (late spring)

when temperatures are still cool and soils are moist. Summer patch often becomes active later in the season (June-July) after temperatures have warmed up. In some areas of the lawn, NRS patches will disappear with higher temperatures, while in other areas infected patches may reappear under drought or heat stress. In the fall, NRS infection centers can reappear and may continue through winter and early spring. Symptoms of SP emerge during hot, wet weather (rainy days or heavy thunderstorms) in the summer. Symptoms from the previous summer of both diseases may still be visible in the fall and even the following spring. Recovery from both diseases is slow.



Fig. 1. Initial symptom of necrotic ring spot¹



Fig. 2. Necrotic ring spot showing distinct separation and clearly defined areas.¹

Even though grass blades do not become infected by either disease, they typically turn a reddish-brown to bronze, and finally straw color, after roots are infected and killed, depriving the plants of water and nutrients (Fig. 2). There are no leaf lesions on foliage infected with NRS or SP. Heat and drought exacerbate symptoms, making them more noticeable (Fig. 3). Frequently, a few turf plants will survive and recolonize some of the infected areas, creating a ring-like pattern (Fig. 4). In other cases, all of the turf in a patch will die, leaving an indentation with dead grass in the lawn. As the diseases advance, roots, crowns, and lower stems will develop a black or brown discoloration (Fig. 5). Dark fungal hyphae can be present on the surface of roots, stems and rhizomes (Fig. 6). These hyphae, however, are not unique to the NRS and SP pathogen. Other fungal turf pathogens produce them as well. Infected roots are usually brown to black. Pseudothecia (fruiting bodies containing spores) may be present on the infected crowns or roots, although these are rarely seen in the field (Fig. 7). Necrotic ring spot and SP are usually more severe in turf established from sod and in areas with compacted soil. When present, disease symptoms typically appear 2-3 years after turf establishment, but may appear as many as 10 years later. Older turfgrass varieties may also be more susceptible to both pathogens.

DISEASE CYCLE

Necrotic ring spot and SP pathogens survive harsh conditions in plant debris and are thought to colonize neighboring plants by growing on the surface of roots and rhizomes. The hyphae initially colonize the surface of roots eventually invading the root and rhizome tissues. Infection of roots leads to a decrease in water and nutrient uptake, exposing the plants to other environmental stresses or killing them. Infection of turf with NRS happens in spring or fall when soil temperatures reach 60-70°F at 3" depth. Infections with SP occur within a similar temperature range (65-70°F) in late spring.

DIAGNOSIS

To be certain that NRS or SP is causing the symptoms seen in turf, samples can be dug and checked for the presence of the pathogens (Fig. 7 and 8). Fruiting structures of NRS are rarely seen. For diagnostic purposes, roots are cleaned of soil and examined for growth cessation structures produced by SP (Fig. 8). If no growth cessation structures are found the disease is considered to be NRS. The Utah Plant Pest Diagnostic Lab (<http://utahpests.usu.edu/upddl/>) provides sampling recommendations and accurate diagnosis.



Fig. 3. A lawn showing more severe symptoms of NRS with coalescing rings.²

MANAGEMENT

Management practices that reduce stress on turfgrasses will help to suppress NRS and SP. Raising mowing heights to 2.5 to 3 in. encourages deeper rooting of the turf, improving stress tolerance. Though not typically recommended, thicker thatch layers and more compacted soils may require vertical mowing or power raking. This is usually done to ensure good soil-to-seed contact for germination, if re-seeding an area is required. Lawns should also be watered deeply and as infrequently as possible without creating water stress. In the presence of NRS and SP, however, more frequent watering will cool the grass, reducing temperature stress and allowing infected plants to survive high afternoon temperatures. Avoid over-fertilization with nitrogen, particularly in the spring, and choose slow-release fertilizers as opposed to quick-release fertilizers that can exacerbate disease symptoms. Fertilizer formulations containing sulfur-coated urea and applications of elemental sulfur as soil amendments may help to suppress the diseases.

Resistant Turfgrass Cultivars*

There are no varieties of Kentucky bluegrass that offer complete resistance to NRS and SP, though some cultivars are more disease-tolerant than others. Midnight, NuDestiny, Everglade, Everest, Award, Granite Seed Company's Corsair, Rugby II, Ginney II, Jump Start, America, Blue Velvet and Quantum Leap have shown some resistance to SP. Midnight, Award, Langara, NuDestiny, Blue Velvet, America, Jump Start, Everglade, Everest, and Ginney II have shown some resistance to NRS. Planting mixtures of two or more grass species and two or more disease-resistant cultivars will reduce the susceptibility of a lawn to NRS and SP. Overseeding infected areas with resistant cultivars can also reduce the incidence of the diseases. In severe cases, consider overseeding infected areas with perennial ryegrass, which is reported to be immune to NRS and SP. Overseeding with resistant varieties may also be less expensive, in the long term, than regular fungicide applications applied year after year. Be aware that different turfgrass species

have different colors and textures that may be visible when seeded in mixtures. However, perennial ryegrass/Kentucky bluegrass are similar in color and texture and may impart resistance to NRS and SP.

Fungicides

There are some fungicides registered for use on SP and NRS. However, the timing of applications in the spring must be exact to assure effectiveness and the fungicide must come in contact with SP and NRS pathogens before they infect and colonize the plants. In addition, fungicide chemistries have to be rotated frequently to avoid fungicide resistance. Once the pathogens are resistant, they are much more difficult to control. Most fungicides labeled for SP and NRS have to be applied by a commercial applicator and cannot be purchased by homeowners. Products with the following active ingredients may be used: azoxystrobin, propiconazole, thiophanate-methyl, myclobutanil and pyraclostrobin**.

Prevention

Turfgrass plants that are severely infected with NRS and SP can easily be pulled from the soil because of widespread rotting of roots, rhizomes, and crowns. These plants may then spread the diseases if they are moved by mechanical equipment utilized on the site. Effectively cleaning equipment with a power steam washer before moving to another location will help prevent further spreading of the disease. Where NRS and SP infections are severe and recurrent, preventive fungicide application may help suppress the development of NRS and SP, but timing of application is essential (see information under Fungicides).



Fig. 4. Recolonization of infected area by turfgrass.¹



Fig. 5. Blackening of Kentucky bluegrass roots and rhizomes infected with necrotic ring spot.³



Fig. 6. Dark hyphae of necrotic ring spot woven around a Kentucky bluegrass root.²

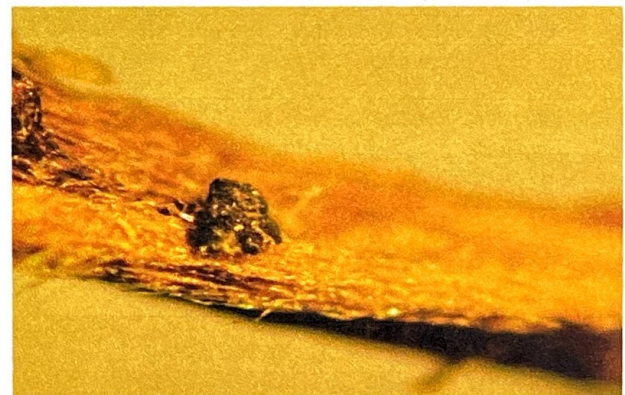


Fig. 7. A pseudothecium of necrotic ring spot embedded in a Kentucky bluegrass root.²



Fig. 8. Growth cessation structures produced by summer patch.⁴

Image credits

¹Image courtesy of JayDee Gunnell, Utah State University, Cooperative Extension, Salt Lake County.

²Image courtesy of Kent Evans, Agricultural Research Service-United States Department of Agriculture, Pullman, Washington.

³Image courtesy of N. Jackson, Turfgrass Compendium (3rd ed.), APS Press.

⁴Image courtesy of Claudia Nischwitz, Utah State University, Dept. of Biology, Logan, UT.

REFERENCES AND ADDITIONAL SOURCES

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Integrated Pest Management

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Common Turf Diseases in Utah

All turf pests



Irregular patches of dead turf. The circles with a pinkish hue are pink snowmold, those with a lighter (almost bleached) appearance are gray snow mold infections.



Gray and pink snow mold infections. Those with pink borders are pink snow mold and those lighter infections with less marked lesions are gray snow mold infections.



Arrows indicating sporodochia (spore masses) produced by the pink snowmold fungus.





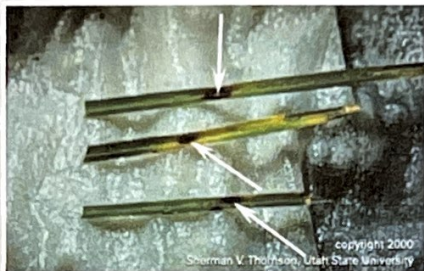
Matted patch of grass infected with the gray snowmold fungus.



Advancing border of turf infected with a snowmold fungus.



Thinning and necrosis of grass, common when Melting Out fungi are infecting the plant tissues.



Characteristic Melting Out lesions indicated by the arrows. Lesions are brownish-purple and circular to oval in shape with straw colored centers.



Fairy Ring with active fungal reproductive structures (mushrooms).



Circle of dark green grass as indicated by the arrow shows the active edge of the fairy ring. Vegetative portions of the causal fungus will continue to radiate outward periodically producing mushrooms.

SPRING DISEASES

PINK SNOW MOLD

Cause: *Fusarium nivale*--fungus

Importance: Major problem in late fall and early spring. Snow cover not necessary.

Symptoms: Irregular patches with light pink margins.

Control:

1. Avoid heavy fertilization in the fall.
2. Avoid heavy snow accumulations when shoveling snow.
3. Apply fungicides to previously affected areas in fall and spring.

Fungicides: * Banner, Bayleton, Chipco 26019, Cleary 3336, Fore, Fungo, Rubigan, Terraclor (PCNB), Thiram, Vorlan

GRAY SNOW MOLD

Cause: *Typhula* spp.--fungus

Importance: A serious problem where persistent snow cover is common.

Symptoms: Dead patches of grass in the spring; presence of sandgrain-sized, brown fungal sclerotia embedded in dead leaf tissue.

Control:

1. Avoid heavy snow accumulations when shoveling snow.
2. Physically spread piles of snow or apply black fly ash or graphite to hasten snow melt.
3. Apply fungicide in late fall where snow mold has been a problem.

Fungicides: * Banner, Bayleton, Chipco 26019, Dyrene, Prostar, Rubigan, Terraclor (PCNB), Thiram

MELTING OUT

Cause: *Helminthosporium*-like spp.--fungus

Importance: Prevalent every year. Major reason for dead areas in turf.

Symptoms: General thinning of grass. Circular purplish-brown to dark brown rings around straw-colored spots on leaf blades.

Control:

1. Aerate to reduce thatch in early spring.
2. Avoid a single heavy application of soluble nitrogen in the spring.
3. Water infrequently but deeply.
4. Mow at 2.5 - 3 inches during hot weather.
5. Apply fungicide to areas where problem has occurred in previous years.

SUMMER DISEASES

NECROTIC RING SPOT

Cause: *Ophiosphaerella korrae*--fungus

Importance: Can be a serious problem in spring and fall.

Symptoms: Dead circles or arcs that range in size from several inches to several feet in diameter. Microscopic dark hyphae can be found on the grass crowns. Difficult to control even with fungicides.

Control:

1. Aerate to reduce thatch in early spring.
2. Nitrogen fertilizer should be applied frequently and at low rates when the grass is actively growing. Use an acid type fertilizer like ammonium sulfate.
3. Keep mowing height at 2.5 - 3 inches.
4. Water infrequently but deeply.
5. Apply fungicides where necrotic ringspot has been a problem.
6. Replant with several grass species with resistance.

Fungicides:* Chipco 26019, Fungo, Rubigan, Banner Max, Heritage, Eagle, Sentinel

SUMMER PATCH

Cause: *Magnaporthe graminicola*--fungus

Importance: Can be a serious problem . May be present during the summer.

Symptoms: Dead circles or arcs that range in size from several inches to several feet in diameter, indistinguishable from necrotic ring spot. Microscopic dark hyphae can be found on the grass crowns. Difficult to control.

Control:

1. Aerate to reduce thatch in early spring.
2. Nitrogen fertilizer should be applied frequently and at low rates when the grass is actively growing.
3. Mow at 2.5 - 3 inches.
4. Water infrequently but deeply.
5. Apply fungicide where the disease has occurred.
6. Replant with several grass species with resistance.

Fungicides:* Banner, Bayleton, Fungo, Rubigan, Alamo, Tilt, Sentinel, Intercept, Eagle, Cleary's 3336, Topsin, Heritage, Abound, Fungicide IX.

FAIRY RING

Cause: Various *basidiomycete* fungi

Importance: Common but only important in a few situations.

Symptoms: Circle of dark green grass with mushrooms forming in the band. Occasionally, the grass dies within the ring.

Control:

1. Keep turf adequately fertilized to promote even turf growth and color.
2. Aerate or use surfactants to improve water penetration into rings. Silicone surfactants work best.
3. If problem is severe, kill grass with glyphosate herbicide, rototill, and replant.
4. Prostar fungicide* provides suppression.

POWDERY MILDEW

Symptoms: White powder on leaves, especially in shady areas.

Control:

1. Do not plant turf in heavy shade.
2. Prune trees and shrubs to enhance light penetration.
3. Water infrequently but deeply.
4. Plant shade-adapted varieties (fescue).
5. Apply fungicides to turf with a history of mildew.

Fungicides: * Banner, Bayleton, Rubigan

*Some of the fungicides listed are not readily available for home lawn use but can be obtained from commercial businesses or applied by a commercial operator.

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