



Necrotic Ring Spot & Summer Patch in Kentucky Bluegrass Lawns

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IMPORTANCE

Necrotic ring spot and summer patch are two patch diseases that can be very destructive when Kentucky bluegrass is grown under intensive management. In addition to bluegrass, certain fine-leaved fescues are susceptible.

These diseases become a concern in lawns under intensive management for two reasons:

1. Improper lawn management practices, such as close mowing, can aggravate disease development.
2. Homeowners and landscape managers usually have high aesthetic expectations and tolerate little turf damage.

SYMPTOMS

Necrotic ring spot and summer patch produce similar symptoms in Kentucky bluegrass. The timing of symptom development is a good way to distinguish between these diseases. Necrotic ring spot often appears in early summer, while summer patch, the more common disease in Kentucky landscapes, develops in middle to late summer.

NECROTIC RING SPOT

Symptoms of this disease usually appear during the last week of May or the first few weeks of June, especially if dry conditions are prevailing. The disease appears first as bluish-green wilted grass in patches 6 inches to 3 feet in diameter. Patches quickly become brown as the wilted grass dies (FIGURE 1).



FIGURE 1. DISTINGUISHING BETWEEN NECROTIC RING SPOT AND SUMMER PATCH CAN BE DIFFICULT SINCE THESE DISEASES PRODUCE SIMILAR SYMPTOMS; HOWEVER, TIMING OF SYMPTOM DEVELOPMENT IS A HELPFUL DIAGNOSTIC TOOL. NECROTIC RING SPOT, WHICH OCCURS IN EARLY SUMMER, IS PICTURED HERE.



FIGURE 2. NECROTIC RING SPOT. A TUFT OR PATCH OF HEALTHY TURF IS OFTEN PRESENT IN THE CENTER OF AFFECTED PATCHES, GIVING THE TURF A “DONUT” OR “FROG-EYE” APPEARANCE.

FIGURE 3. SUMMER PATCH. CIRCULAR OR CRESCENT-SHAPED DEAD PATCHES ARE TYPICAL OF THIS DISEASE. TUFTS OR PATCHES OF HEALTHY TURFGRASS SOMETIMES APPEAR IN THE CENTER OF THE PATCHES.

Often, a tuft or patch of healthy turf is present in the center of affected patches, giving the turf a “donut” or “frog-eye” appearance (FIGURE 2).

Roots of affected tillers have a light brown to dark brown decay. Although symptoms generally first develop in early summer, they can persist throughout summer until cool weather allows the turf to begin to recover.

SUMMER PATCH

Circular or crescent-shaped dead patches (FIGURE 3) measuring a few inches to 2 or 3 feet across appear from late July through August. When the disease is most active, the margins of affected patches can have a slightly bronze color as plants die.

Tufts or patches of healthy turfgrass tillers sometimes appear in the center of the patches. This “frog-eye” symptom occurs less frequently with summer patch than it does with necrotic ring spot.

Individual dead plants are characterized by a dry, dark brown decay of the roots, which can progress into the crown. Patches can merge together over large areas of turf when the disease is severe, which makes recognition of the characteristic patches difficult. Bare spots remain in the turf until the grass recovers in early autumn or the following spring.

CAUSES & DISEASE DEVELOPMENT

Until the early 1980s, patch diseases of Kentucky bluegrass were collectively known as ‘Fusarium blight’ and believed to be the result of crown infections by *Fusarium* fungi. Turf pathologists now recognize these as two distinct root rot diseases. Aboveground symptoms result when decayed roots are unable to supply adequate water and nutrients to foliage.

NECROTIC RING SPOT

The necrotic ring spot pathogen is a soil-borne fungus, *Ophiosphaerella korrae*. Root infections are favored by unseasonably cool, wet weather in late April and May. Aboveground symptoms become apparent as warm, dry weather in early summer puts stress on tillers with root rot.

Disease is often more severe in areas where the soil dries out more quickly, such as on knolls or slopes. Other factors favoring disease development include overwatering, soil compaction, and high nitrogen fertility during spring or summer.

SUMMER PATCH

Summer patch is caused by the soil-borne fungus, *Magnaporthe poae*, which actively infects roots in warm (77°F to 86°F), wet soils. Frequent rainfall and/

or irrigation during July and August can lead to severe root rot. Root infections develop over a period of several weeks before aboveground symptoms (wilt and death) become evident.

Management practices favoring disease development include close mowing, light and frequent irrigation, high nitrogen fertility during spring or summer, excessive thatch accumulation, and soil compaction.

DISEASE MANAGEMENT

Disease management of necrotic ring spot and summer patch requires an integrated approach. Managing turf so it can better tolerate disease is the most practical way to deal with these diseases in most lawns. Incorporate as many of the following practices as possible to maintain healthy turf.

Note: because some management strategies may depend on which disease is present, it is important to obtain a definitive diagnosis. Turf samples can be submitted to a local county Extension office when diagnostic assistance is needed.

CULTIVAR SELECTION

- Plant a Kentucky bluegrass variety that has performed well in University of Kentucky field trials (see Additional Resources) when establishing a new lawn or over-seeding an established lawn. Both of these patch diseases occur naturally at the UK test site in Fayette County, and nearly 150 Kentucky bluegrass varieties have been evaluated over several years for their reactions to patch diseases under Kentucky conditions. While no Kentucky bluegrass variety is immune to patch diseases, there have been striking differences in the way varieties react to these diseases; disease development can be reduced greatly in some varieties. Disease management practices described below are still important when using these varieties.
- Inter-seed perennial ryegrass into areas affected by the patch diseases. Perennial ryegrass establishes easily and is not affected by either disease.
- Renovate lawn with tall fescue, which is not affected by either patch disease.

MOWING HEIGHT

- Mow Kentucky bluegrass lawns to a height between 2 and 3 inches.
- Avoid close mowing, which has been shown to favor summer patch. While its effect on necrotic ring spot has not been studied, close mowing in general is known to lead to restricted root development in turfgrasses, making tillers more vulnerable to root rot diseases. In contrast, raising the mowing height promotes healthier turf with better root development and higher levels of nutritional reserves needed for stressful periods.

IRRIGATION

Necrotic Ring Spot

- Irrigate lightly and frequently. While this practice is normally discouraged because it can intensify a number of turf diseases, irrigating lightly and frequently often helps keep turf somewhat healthy in sites where necrotic ring spot is the principal problem.

Summer Patch

- Irrigate to a depth of 3 to 4 inches as needed in summer; allow soils to dry out between irrigations.
- Do not irrigate lightly and frequently during hot, dry summers, as this, combined with close mowing, can intensify summer patch substantially.
- Check the watering depth by pushing a metal rod or screwdriver into the soil. It will sink easily until it reaches dry soil. To determine when to irrigate again, step on the grass—if it fails to spring back up, consider irrigating.

FERTILITY

Cool-season grasses, such as Kentucky bluegrass, should receive all or at least two-thirds of their annual nitrogen fertilizer during autumn and early winter. Heavy nitrogen fertility during spring or summer can promote development of patch diseases.

Necrotic Ring Spot

- Apply light applications of nitrogen fertilizer during periods when aboveground symptoms occur; this can help the turf tolerate root infections of *O. korrae*.

- Apply slow-release forms of nitrogen fertilizer, which has been shown to reduce disease severity in sites with serious necrotic ring spot problems.
- Do not rely on organic fertilizers for management. While certain organic fertilizers, containing such materials as feathermeal, bonemeal, and soybean meal, reduced severity of necrotic ring spot in some experiments, results have been poor in other well-conducted field tests.

Summer Patch

- Use ammonium sulfate, ammonium chloride, or sulfur-coated urea as nitrogen sources as these can reduce the severity of summer patch; avoid fertilizer formulations containing nitrates.
- A long-term fertilization program with ammonium fertilizers or sulfur-coated urea can increase soil acidity (that is, lower soil pH), which creates an inhospitable soil environment for *M. poae*. This effect is probably not as pronounced in high-clay soils or soils receiving a great deal of irrigation each season, but it may be beneficial in many Kentucky landscapes.
- Choose a fertilizer with low burn potential, such as sulfur-coated urea, if the lawn receives fertilizer during hot weather.

FUNGICIDES

Use of fungicides for control of patch diseases in lawns and landscapes is discouraged due to a number of concerns:

- Repeated applications of high rates of fungicides are usually needed for patch disease management.
- Fungicides will not cure these diseases, but only temporarily suppress them.
- These fungicides are expensive.

Homeowners with lawns requiring repeated use of fungicides to maintain acceptable quality should consider renovating with a different turf species or variety.

Commercial pesticide applicators can refer to UK Extension publication *Chemical Control of Turfgrass Diseases* (PPA-1), which provides information on managing these patch diseases with fungicides. Use of fungicides containing chlorothalonil or iprodione should be avoided because they have been shown to enhance the severity of summer patch.

ADDITIONAL RESOURCES

- Plant Pathology Extension Publications
<https://plantpathology.ca.uky.edu/extension/publications>
- Chemical Control of Turfgrass Diseases, PPA-1
<http://www.ca.uky.edu/agc/pubs/ppa/ppa1/ppa1.pdf>
- Recommended Turfgrass Varieties
<http://www.uky.edu/Ag/ukturf/varieties.html>
- Submitting Plant Specimens for Disease Diagnosis
<https://plantpathology.ca.uky.edu/files/ppfs-gen-09.pdf>

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