



Look-alike Kentucky Bluegrass Diseases

By Steve Abler and Dr. Geunhwa Jung, Turfgrass Diagnostic Lab, Department of Plant Pathology, University of Wisconsin-Madison

It is common occurrence to see circular or arc-like patches of blighted Kentucky bluegrass in the late spring and summer months. Using these symptoms alone, it is not possible to give a positive identification of the causal agent of the patches. This is due to the fact that there are three diseases of Kentucky bluegrass that produce patches during the same months of the year that are virtually indistinguishable from each other. Once the turf samples are collected and examined in the lab, the job does not get much easier. But before I get ahead of myself, let's backtrack forty-five years to when the first of these diseases was first being noticed.

In 1959, the first reports were made of a patch-like decline of Kentucky bluegrass in Pennsylvania. In the following years, the disease was found to be widespread in the Eastern United States and was found causing damage to creeping bentgrass and creeping red fescue as well. The cause of the declining turfgrasses was determined to be the pathogenic fungi *Fusarium culmorum* and *Fusarium poae* (Couch and Bedford, 1966). Because of the genus of the pathogens and the symptoms of the decline, the disease they cause was named Fusarium blight.

Later, in the 1970's, Kentucky bluegrass lawns and golf course fairways in Wisconsin were afflicted by a disease that looked very similar to Fusarium blight, however, pathogenic species of *Fusarium* could not always be found in these patches. Upon closer examination by Dr. Gayle Worf of the Plant Pathology Department at the University of

Wisconsin-Madison, the crowns and roots of affected plants were found to be colonized by a fungus that was identified as *Leptosphaeria korrae* (later changed to *Ophiosphaerella korrae*). Based on the patch symptoms, Dr. Worf named this new disease necrotic ring spot (Worf, et al., 1986).

At the same time that Dr. Worf was working on necrotic ring spot, researchers in New York and Rhode Island were looking into a third fungus that was associated with Kentucky bluegrass showing symptoms similar to Fusarium blight. The pathogen causing this "Fusarium blight syndrome" was determined to be the previously undescribed fungus *Magnaporthe poae* (Landschoot and Jackson, 1989). Because the symptoms caused by *M. poae* were usually noticed during warmest months of the year, the disease was named summer patch.

Due to the similarities in symptoms among Fusarium blight, necrotic ring spot, and summer patch and the fact that symptoms manifest themselves at the same time of the year, a detailed knowledge of all of the characteristics of each disease is required for accu-

rate diagnosis of the problem.

Fusarium Blight

Most cool-season turfgrasses are hosts of the Fusarium blight pathogens; however, Kentucky bluegrass, annual bluegrass, and creeping bentgrass are the most commonly damaged species. Outbreaks of Fusarium blight are favored by dry conditions in which the daytime air temperatures are above 80°F and nighttime air temperatures are above 70°F. Consequently, symptoms of Fusarium blight are initially seen drier in areas such as southern exposures, tops of slopes, and turfgrasses near cart paths or driveways. The severity of disease is also increased by high nitrogen fertility, calcium deficiency, and excessive thatch.

Symptoms on Kentucky bluegrass maintained at fairway or rough height are circular or arc-like patches of straw-colored grasses about six inches to a few feet in diameter. The outside edges of the patches are often reddish-brown in color while the centers of larger patches often have a tuft of green, seemingly unaffected grasses (frog-eye pattern); see figure 1.

Upon close inspection, the leaf blades at the outside margin of the

Figure 1



patches often have non-distinctive reddish or tan lesions. The sheath, crown, and roots of colonized plants are a brownish-red in color from dry rot. On closely mown bentgrasses and annual bluegrasses of putting greens, symptoms of *Fusarium* blight are irregular patches of reddish brown or orange grasses a few inches to a few feet in width (Figure 2).

Spores of the *Fusarium* blight pathogens are readily visible when colonized plants are microscopically examined. Unfortunately, the presence of *Fusarium* spores alone is not enough to render a positive diagnosis because there are several species of *Fusarium* that grow in thatch and soil that are not pathogenic to turfgrasses.

The severity of *Fusarium* blight can be reduced by maintaining adequate soil moisture for plant growth, managing thatch depth, and by avoiding excessive nitrogen fertilization during warm, dry weather. Fungicides proven to be efficacious in the control of *Fusarium* blight include triadimefon, fenarimol, myclobutanil, thiophanate-methyl, iprodione, and mancozeb.

Necrotic Ring Spot

Necrotic ring spot is mainly a disease problem of Kentucky bluegrass, annual bluegrass, and fine-leaved fescues. Weather conditions that are conducive for colonization of roots and crowns of host plants include periods of cool, wet weather that are common in the spring and fall of the year.

Symptoms of necrotic ring spot are usually not visible until the warm, dry weather of the late spring and early summer causes the plants to wilt due to the dysfunctional root system. At this point, the pathogen has gone dormant, and curative fungicide applications will not be effective.

Symptoms on Kentucky bluegrass maintained at fairway or rough height are depressed, circular or arc-like patches of straw-



Figure 2.



Figure 3.

colored grasses about six inches to a few feet in diameter. Individual plants on the outside edge of the patches are often purplish in color while the centers of larger patches often have a tuft of green, seemingly unaffected grasses (frog-eye pattern); see figure 3.

There are not leaf lesions associated with necrotic ring spot; however, the crown and roots of diseased plants are dark brown to black in color. Microscopic examination of the roots and crown area reveals dark brown runner hyphae of the pathogen. The severity of necrotic ring spot can be reduced by avoiding early spring (before May 15th) applications of nitrogen containing fertilizer.

Practices that promote healthy root growth such as core aeration, and proper irrigation will also make the host plants more tolerant to colonization by the pathogen.

To be effective, fungicide applications for the control of necrotic ring spot must be applied preventatively. Fungicide applications should be initiated when the soil temperature (3-inch depth) reaches 60°F and should be reapplied every 28 days as long as conditions remain cool and wet. Fungicides labeled for the control of necrotic ring spot include azoxystrobin, fenarimol, iprodione, myclobutanil, propiconazole, and thiophanate-methyl.

Summer Patch

Summer patch is primarily a disease problem of annual bluegrass, Kentucky bluegrass, and fine-leaved fescues. There have also been recent reports of *M. poae* causing damage to creeping bentgrass in the Southern United States.

Weather conditions that are conducive for colonization of roots and



Figure 4.

crowns of host plants include periods of hot, wet weather. Summer patch is often a problem soon after heavy rainfall events in the mid-summer when the soil is saturated. Symptoms on Kentucky bluegrass maintained at fairway or rough height are depressed, circular or arc-like patches of straw-colored grasses about six inches to a few feet in diameter. The centers of larger patches often have a tuft of green, seemingly unaffected grasses (frog-eye pattern); see figure 4.

On closely mown annual bluegrasses found on golf course putting greens, symptoms of summer patch are roughly circular patches of yellow to reddish-brown annual bluegrass grasses a few inches up to a foot in diameter. The more resistant creeping bentgrass usually fills in the center of patches produced by the summer patch pathogen.

Closer inspection of the affected plants does not reveal any leaf lesions associated with summer patch, however, straw colored

bands may appear on the leaves as the initial plant symptom of heat and drought stress. The crown and roots of diseased plants are dark brown to black in color. Microscopic examination of the roots and crown area reveals dark brown runner hyphae of the pathogen as well as discolored vascular tissue.

Practices that promote healthy root growth will make the host plants more tolerant to colonization by the pathogen. Since the development of summer patch is enhanced by alkaline conditions, the use of acidifying fertilizers such as ammonium sulfate and sulfur-coated urea reduces disease severity.

To be effective, fungicide applications for the control of summer patch must be applied preventatively. Preventive fungicide applications should be initiated when soil temperature (3-inch depth) reaches 65°F and should be reapplied every 28 days as long as conditions remain hot. Multiple fungicides are labeled for the control of summer patch and include: azoxystrobin, fenarimol,

fludioxonil, myclobutanil, propiconazole, pyraclostrobin, thiofanate-methyl, triadimefon, trifloxystrobin, and vinclozolin.

Because of the difficulties encountered when attempting to diagnose these problems, it is very important to take every effort available to prevent disease outbreaks. Sound cultural practices including proper irrigation, fertilization, and aerification, as well as preventative fungicide applications can greatly diminish the chances that you will encounter these diseases.

Additionally, the turfgrass pathology group at the University of Wisconsin-Madison has evaluated 100 cultivars of Kentucky bluegrass for their susceptibility to necrotic ring spot (Abler et al. 2003). Future plans are to update this work by evaluating 100 current Kentucky bluegrass cultivars for their susceptibility to necrotic ring spot and summer patch.

As always, if you are having difficulty with these troublesome diseases, or any other turfgrass problems, do not hesitate to contact the Turfgrass Diagnostic Lab at 608-845-2535.

Literature Cited

- Abler, S., Gregos, J., and Jung, G. 2003. Evaluation of Kentucky bluegrass cultivars for necrotic ring spot. Wisconsin Turfgrass Research Reports vol. 21.
- Couch, H.B., and Bedford, E.R., 1966. *Fusarium* blight of turfgrasses. *Phytopathology* 56: 781-786.
- Landschoot, P.J., and Jackson, N., 1989. *Magnaporthe poae* sp. nov., a hyphopodiate fungus with a *Phialophora* anamorph from grass roots in the United States. *Mycological Research* 93:59-62.
- Worf, G.L., Stewart, J.S., and Avenius, R.C. 1986. Necrotic ring spot disease of turfgrasses in Wisconsin. *Plant Disease* 70: 453-458. ♣