

Patch Diseases of Turfgrasses: An Update

by Houston B. Couch,

The classic 'patch' symptom pattern in turfgrass is one in which the overall appearance of the area is characterized by the blighting of the majority of the leaves of the plants in a section of otherwise green turf. At present, there are 16 known patch diseases of turfgrasses. Various members of this disease group occur throughout the year on both warm-season and cool-season turfgrasses. (See Table 1 for a complete list of the patch diseases and the grasses they affect - page 15.)

The patch diseases are among the most difficult to diagnose. This is due to the fact that some of the more dramatic symptoms associated with certain of these diseases can also be brought on by stresses from the environment or improper management practices. Also, the primary field diagnostic features for many of the patch diseases closely resemble each other. For example, one of the symptom patterns common to several of these diseases is the so-called "frog-eye" effect. This is a more or less circular area of blighted grass with a center of green, apparently healthy plants. At present, nine patch diseases are known to be capable of producing this type of symptom: (i) spring dead spot of Bermudagrass, (ii) Fusarium patch, (iii) Rhizoctonia yellow patch, (iv) necrotic ring spot, (v) take all patch, (vi) Pythium blight, (vii) Fusarium blight, and (viii) Rhizoctonia blight, and (ix) Sclerotium blight.

In addition to creating some confusion in diagnosis, the failure to understand the fact that this "frog-eye" symptom pattern occurs with many patch diseases other than Fusarium blight has also led to confusion in the use of terminology. For example, in the late 1970's, reports from Cornell University began to refer to any patch disease that produced blighted grass with center tufts of green plants as part of its symptom pattern as "Fusarium blight syndrome."

The type of problem this has created in communications where patch diseases are concerned is illustrated in a published report on the results of the 1983 Cornell field disease control trials (APS Fungicide and Nematicide Tests, Vol. 39, page 182). This data shows two entirely different types of fungicides, the Phycomycete (Pythium) specific fungicide Subdue and the non-Phycomycete active fungicides Bayleton and Tersan 1991 all controlling the same disease, "Fusarium blight syndrome," in the same plots.

Since the ambiguity of this particular terminology has made it impossible to understand exactly which disease is being referred to, "Fusarium blight syndrome" is no longer considered to be a valid designation for any of the patch diseases of turfgrasses.

Research during the past 5 years has added much to our understanding of both the cause and control of several of the patch diseases. The nature of the fungus that causes winter crown rot in Canada has been worked out. Three newly recognized patch diseases (Limnomyces pink patch, necrotic ring spot, and Phizoctonia yellow patch), are now included in the spring and fall group. While, with the summer patch diseases, a new entry, Sclerotium blight, has been added to the list, diagnostic techniques have been refined for Pythium blight, Rhizoctonia blight and Fusarium blight, and more effective fungicides have been developed for the control of Pythium blight and Fusarium blight.

In this report, we will not attempt to cover all of the patch

diseases. Instead, we will review the highlights of some of the more recent research findings on the nature of the newly recognized spring and summer diseases and outline some of the latest developments in the "state of the art" which diagnosis and control of certain of the other patch diseases are concerned.

Spring and Fall Patch Diseases

Necrotic Ring Spot

Necrotic ring spot is a newly recognized disease of turfgrass in North America. It has been reported from the Pacific Northwest and northeastern, midwestern, and north central sections of the United States. This disease can be very destructive on Kentucky bluegrass and bentgrass. It also affects ryegrass, red fescue, tall fescue and chewings fescue.

In the early stages of development, necrotic ring spot is seen as irregular patches of grass that have a general appearance of drought injury. The plants are often stunted or discolored; turning various shades of red, yellow or tan. As the disease progresses, these areas take on a dull tan to brown appearance.

The individual areas of dead grass are usually more or less circular in outline, and may range from a few inches to several feet in diameter. Eventually, many of the affected areas will take on a distinctive "frog-eye" appearance. Also, as the thatch decomposes in these areas, there develops a distinct "sunken pocket" appearance to the turf.

Necrotic ring spot is incited by the fungus *Leptosphaeria korrae*. Development of the disease is favored by cool wet weather in the spring and fall. During April and May, heavy outbreaks of the disease are known to occur after prolonged periods of rainfall.

Field research reports from Washington State and Wisconsin indicate that Chipco 26019 and Banner provide good control of necrotic ring spot, while Bayleton has been found to be ineffective in controlling the disease.

Rhizoctonia Yellow Patch:

Rhizoctonia yellow patch is caused by *Rhizoctonia cerealis*. This disease has been reported from Canada, northeastern United States, the eastern seaboard states, Kentucky, and the north central states. It can be very destructive to Kentucky bluegrass, but causes only slight to moderate damage to creeping bentgrass, tall fescue, Bermudagrass and zoysia.

During its early stages of development, Rhizoctonia yellow patch appears as light green to distinctively yellow-green patches 2-3 inches in diameter. In Kentucky bluegrass, the color of these areas fade to a light tan to brown. The size of the individual patches may eventually extend up to 3 feet in diameter. In the case of bentgrass, tall fescue, Bermudagrass or zoysia, the color of the patches may remain yellow-green for several weeks, but fail to turn brown. Eventually, the plants in these areas may recover fully from the disease.

The "frog-eye" symptom pattern of distinct rings of yellow-green to brown areas of grass with sections of healthy-appearing plants in the centers is very common for Rhizoctonia yellow patch. Also, these patches often have a pronounced sunken appearance due to the rapid decomposition of the thatch.

When conditions are particularly favorable for development of the disease, the plants near the margins of the affected areas will frequently have a characteristic reddish to reddish-purple appearance. This discoloration begins at the leaf tip and then moves progressively toward the sheath. (cont'd. page 11)

(Patch Diseases cont'd.)

The development of Rhizoctonia yellow patch is favored by cool wet weather. The primary temperature range in which the disease is most active is 40 to 60 degrees F. When the leaf symptoms are in the early chlorosis stage of development, if the air temperatures drop below 40 degrees F. or go above 75 degrees F., these symptoms will disappear. However, if the temperatures stay within the 40-60 degree range, the disease will progress to foliar blighting.

Since many of the field symptoms of Rhizoctonia yellow patch and necrotic ring spot overlap, and both diseases can occur in the same location and at the same time of the year, confirmation of the diagnosis by laboratory examination of crowns and roots of diseased plants for the presence of the characteristic Rhizoctonia mycelium is advisable.

Attempts to control Rhizoctonia yellow patch with applications of fungicide have met with little success. Research at Ohio State University has shown that 'Adelphi', 'Cheri', and 'Touchdown', Kentucky bluegrass are highly resistant to this disease.

Summer Patch Diseases

Fusarium Blight

Many species of Fusaria are found in association with stands of turfgrass. Only three of these, however, have been shown by research procedures to be pathogenic to turfgrass plants. These are (i) **Fusarium nivale**, the incitant of the winter disease, Fusarium patch, and (ii) **Fusarium culmorum** and **Fusarium poae**, the incitants of the warm weather patch disease, Fusarium blight. All of the other Fusarium species that are commonly isolated from turfgrass have been shown to be either non-pathogenic or at best very weakly pathogenic. This means that they can not function as primary parasites of either leaves, crowns or roots. In order for a warm weather patch disease to be diagnosed as Fusarium blight, then, either **Fusarium culmorum** or **Fusarium poae** must be present in the diseased tissue. If one of these two species is not present, then the disease in question is not Fusarium blight.

Fusarium blight is a major disease of Kentucky bluegrass, bentgrass, tall fescue, red fescue and ryegrass. The total pathology of the disease consists of two phases: (i) a direct blighting of the leaves, and (ii) a crown and root rot. All turfgrass species are vulnerable to the crown and root phase of Fusarium blight, but the impact of this aspect of the disease is more pronounced on ryegrass and tall fescue. One of the economic impacts of Fusarium blight in tall fescue sod production is the reduction in the size of the root systems to the extent that even though the plants may not be showing foliar symptoms, the sod shatters when lifted.

The better known foliar symptom for Fusarium blight is the so-called "frog-eye" pattern. In field diagnosis, however, it is important to keep in mind that this symptom pattern is not always present. Also, at least two other warm weather patch diseases, Pythium blight and Rhizoctonia blight (brown patch) can develop very pronounced "frog-eye" patterns — particularly under fairway and tees cutting heights.

Fusarium blight can be very destructive to bentgrass under putting green management. On putting greens, the disease first appears as tan to light brown, irregularly-shaped areas 2-3 inches in diameter. Under favorable weather conditions, these patches will develop into irregularly shaped areas of blighted grass

(cont'd. page 14)

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