Sclerotium blight on bentgrass.

Pythium blight on bentgrass.

SECOND OF THREE PARTS

THE PATCH WARS

As the temperature rises, so does the number of patch disease problems. Identification is the key to control.

by Dr. Houston Couch, Virginia Polytechnic Institute and State University

Accurate diagnosis, vitally important to the development of a successful turfgrass disease control program, determines the course of action for the selection of the pesticide, the rates of application, and the details of the treatment schedule.

If diagnosis is incorrect, there cannot be an intelligent approach to implementing procedures for control.

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Diagnosis—not always an easy task—is complicated by the fact that the primary symptom patterns of turfgrass diseases varies with different climatic and management conditions.

For example, helminthosporium leaf spot of the cool season grasses is characterized by a well-defined leaf spot. However, the lesion develops only when air temperatures are 85 degrees F or less.

As temperatures rise above 85, the incidence of leaf spots begins to give way to a nondescript foliar blighting.

When temperatures reach the mid-90s, leaf blighting becomes the dominant symptom form. With temperatures in the 85-95 degree range, the overall symptom pattern of helminthosporium leaf spot on bentgrass putting greens will take on many of the characteristics of either pythium blight or rhizoctonia blight.

Another complicating factor in diagnosis is the similarity among some of the primary symptoms of certain diseases.

For example, although melting-out of Kentucky bluegrass and helminthosporium leaf spot of Kentucky bluegrass are incited by different species of fungi, the leaf lesions of the two diseases are almost identical.

Positive diagnosis sometimes requires a laboratory-based examination of the diseased tissue to determine which of the two organisms is present.

Many factors complicate diagnosis when identifying the patch diseases. The "patch" symptom pattern is one in which the overall appearance of the area is characterized by the death of the majority of the leaves of the plants in a section of otherwise green turf.

Of the 17 known warm- and cool-season turfgrass patch diseases, five occur during the winter, five during the spring and fall, and seven in the summer.

The summer patch diseases are fusarium blight, sclerotinia dollar spot, sclerotium blight, pythium blight, rhizoctonia blight, melanotus white patch, and the senescence syndromes (summer patch).

The following covers fusarium blight, sclerotium blight, and pythium blight, describing key diagnostic features, listing specific weather and management conditions that favor development, and giving control practices for each member of this group.

Next month we will examine rhizoctonia blight, melanotus white patch, and summer patch.

Fusarium blight

Fusarium blight is a disease of Kentucky bluegrass, bentgrass, tall fescue, red fescue, and ryegrass.

The holopathology of the disease consists of two phases: a direct blighting of the leaves; and a crown and root rot. The crown and root systems of Kentucky bluegrass and bentgrass are affected by fusarium blight and direct leaf blighting is generally very graphic.

Therefore, in field diagnosis with stands of Kentucky bluegrass or bentgrasses, the possibility of fusarium blight is usually given primary consideration.

However, with fescues and ryegrasses, the initial impact of the disease is usually most pronounced on the crowns and roots. Thus, the likelihood of the disease in question being fusarium blight can be easily overlooked.

Generally, fusarium blight is first seen as scattered, light green patches of grass two-to-six inches in diameter. Under conditions favorable for disease development, the color of these patches changes in 36 to 48 hours to a dull reddish brown, then to tan, and finally to a light straw color.

Initially, the shapes of the patches are elongated streaks, crescents, or circular. The most characteristic feature is seen in the late stages of disease development, when more or less circular patches of blighted turfgrass one-to-three feet in diameter are present.

These areas are tan to straw colored, often have reddish-brown margins one-to-two inches wide, and frequently contain center tufts of apparently-unaffected green grass. This combination produces a distinctive frog-eye effect.

When optimum conditions for disease development exist for an extended period, affected areas coalesce and large areas of turfgrass may be blighted.

Leaf lesions originate both at the cut tip and at random over the entire leaf. First seen as irregularly shaped, dark-green blotches, they rapidly fade to a light green, then reddish-brown, and finally a dull tan.

Individual lesions may involve the entire width of the leaf blade and may extend up to 1/2-inch.

Turfgrass plants affected primarily by the root and crown rot phase of the fusarium blight are stunted, pale green in color, and do not readily recover from mowing or adverse weather conditions.

Their roots are characterized by a brown to reddish-brown dry rot and as the disease progresses, these roots become darker due to the colonization of soil saprophytes.

During periods of relatively high rainfall, the pinkish growth of the pathogens can be seen on the root and crown tissue near the soil surface.

The foliar blighting phase of fusarium blight is most severe during periods of high atmospheric humidity with daytime air temperatures of 80 to 95 degrees F and night air temperatures of 70 or above.

Fusarium blight is also more severe on turfgrass grown under high nitrogen fertilization.

When turf is on a high-nitrogen program, low soil moisture levels will cause an increase in disease severity. Conversely, under low nitrogen fertilization, development of fusarium blight is not affected by soil moisture levels.

If diagnosis is incorrect, there cannot be an intelligent approach to implementing procedures for control.

The two fusarium species that incite this disease can actively colonize thatch and thus the material can serve as a major reservoir for inoculum.

Fusarium blight is caused by *fusarium culmorum* and *fusarium poae.*

Several saprophytic, non-parasitic, species of fusarium colonize the thatch and soil in stands of turfgrass. Therefore, when laboratory diagnostic procedures are employed, one must pinpoint precisely the species of fusaria that are present.

If *fusarium culmorum* or *fusarium poae* are absent, the disease is not fusarium blight.

Management practices that can help reduce the severity of fusarium blight are: 1) maintaining the thatch layer at approximately 1/2-inch thickness, and 2) watering frequently enough to hold the soil moisture close to field capacity.

The sterol inhibiting fungicide Bayleton is very effective in fusarium blight control.

The benzimidazole fungicides Tersan 199l, Fungo 50, and Cleary 3336 are also labeled for control.

In areas with recurring fusarium blight, the fungicide application producing maximum control should be made immediately following the first time night temperatures do not drop below 70 degrees.

Sclerotium Blight

Sclerotium blight (Southern blight), first described on bentgrass golf greens in North Carolina in 1975, has since been identified on annual bluegrass, bentgrass, and ryegrass in California and on Kentucky bluegrass in North Carolina and Maryland.

On Kentucky bluegrass, sclerotium blight is first seen as small, circular dead areas. Usually some green, apparently unaffected grass plants remain in the centers, thereby producing a frog-eye appearance. These circular patches may enlarge up to three feet in diameter.

Some of the affected areas may develop into partial circles or arcs, rather than distinctive, circular patches.

When weather conditions are favorable for disease development, masses of coarse white mycelium may grow on debris on the soil surface and on the dying grass at the edge of the patches. Also, small, round, white to brown-colored hard structures 1/20-to-1/32-inch in diameter known as "sclerotia" can frequently be seen on the dead grass or on the soil surface.

On golf greens, sclerotium blight first appears as yellowish crescent-shaped patches or circular rings with apparently healthy-looking grass in the center. The diameter of these areas will vary from eight-to-36 inches.

While patches may continue to enlarge at a somewhat steady rate throughout the growing season, the center portions of apparently healthy grass expands but at a slower rate.

The fungus that incites sclerotium blight (*sclerotium rolfsii*) affects over 500 species of plants.

Sclerotium blight is a warm weather disease. During hot, humid weather, the thread-like elements (mycelium) that make up the sclerotia begin to grow on organic matter in and on the soil and then spread to living plants.

In the eastern U.S., sclerotium blight usually appears in mid-summer. In California, it becomes apparent in the early spring (usually the second or third week in May) and continues throughout the summer.

At present, there are no commercially used turfgrass fungicides labeled for control of sclerotium blight.

Pythium blight

Under favorable conditions, the most-destructive pythium blight can completely destroy established stands of turfgrass within 24 hours.

After a serious outbreak, it is frequently necessary to completely re-establish the desired turf.

Pythium blight is first seen as

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small, irregularly-shaped areas of diseased turf ranging from ½-to-four inches in diameter.

Initially, the leaves in these patches have a distinct dark green to purplish "water-soaked" appearance.

The leaves then shrivel and the color of the patches fades rapidly to a light brown.

As the disease progresses, the groups of affected patches frequently coalesce to envelope sections of turf from one-to-10 feet in diameter.

The shape of affected areas are often circular with uniform blighting of leaves throughout, or with center sections of green, apparently healthy plants, thus producing a distinctive frog-eye pattern.

In addition to the more or less circular pattern of development, quite commonly the patches will be either crescent-shaped or appear as serpentine streaks of blighted grass six-to-12 inches wide and two-to-three feet in length.

After a serious outbreak (of pythium blight) it is frequently necessary to completely reestablish the turf.

The leaf symptoms are first a water-soaked, dark green to greenish purple. At this point, the leaves are soft and somewhat slimy, and when disturbed by the pressure of foot traffic or mowing equipment, they may mat together. Their color soon fades to a light tan as they shrivel and become somewhat twisted.

If the growth of the pathogen is checked before the entire leaf is blighted, straw-colored lesions develop. These lesions are similar in appearance to those incited by sclerotinia dollar spot with the exception that the reddish-brown margins characteristic of the latter disease are absent.

In the early morning hours, or during periods of high humidity, the leaves of diseased plants may be covered with the white mycelium of the pathogen.

Six pythium species are known to be capable of parasitizing turfgrasses. Certain forms are primarily root inhabitors, while others are also capable of causing severe foliar blighting.

Two species, *pythium ultimum* and *pythium aphanidermatum*, are the primary foliar blighters. The pathogenicity of both of these species is highest at temperatures of 85-95 degrees F. However, *pythium ultimum* can also incite a moderate amount of blighting when the temperatures are in the low 70s.

Pythium blight is also favored by prolonged periods of high atmospheric humidity. Extended periods of leaf wetness contribute materially to heavy outbreaks of the disease.

Disease development is more severe on grass grown at high nitrogen fertility.

Turfgrass growing under conditions of low soil moisture is more susceptible to pythium blight than when the soil is near field capacity.

Pythium blight can be particularly severe on the bentgrasses, ryegrasses, and Kentucky bluegrass. It also affects red fescue, tall fescue, and bermudagrass.

At present, four fungicides are labeled for control of pythium blight: two non-systemics (chloroneb and ethazole), and two systemic materials (metalaxyl and propamocarb).

Chloroneb is sold under the trade name "Terraneb SP," and one of the product names for ethazole is "Koban." These two fungicides are effective in pythium blight control but only function to prevent infections. For maximum effectiveness, they should be used in a preventative spray program.

In areas where pythium blight is a recurring problem, a general rule for the initiation of a preventive spray program with Terraneb SP or Koban is to begin fungicide applications immediately after night air temperatures do not drop below 70.

Metalaxyl is sold for turfgrass use under the trade name "Subdue," and propamocarb is marketed as "Banol."

Both of these fungicides are very effective in the control of pythium blight. For optimum control, these materials must be used at the rates listed on their respective labels.

Field research at Virginia Tech has shown that when Subdue or Banol is used at less than their low label rates, there can be a significant reduction in their capacity to control pythium blight.

A field study at Penn State has found that there is no difference in the control of pythium blight by either Subdue or Banol used alone at half-label rate or when they are combined at half-label rates as a tank mix.

One should remember that while using Subdue and Banol for pythium blight control you should not reduce the rate from the low dosage level listed on the label. You should apply one of the materials at a time. **WT&T**