Kentucky bluegrass afflicted with rhizoctonia blight.

The fruiting structures of the pathogen of melanotus white patch.

THIRD OF THREE PARTS

CONTROLLING THE PATCH DISEASES

Warm weather and patch disease problems go hand-in-hand. Accurate diagnosis is a must for effective treatment.

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

Editor's note: *Last month, Dr. Couch examined several summer patch diseases, including fusarium blight, sclerotium blight, and pythium blight. This month, he examines three other summer patch diseases—rhizoctonia blight, melanotus white patch, and summer patch. He describes key diagnostic features of each disease, listing specific weather and management conditions that favor development, and then gives control practices for each.*

Rhizoctonia blight

Rhizoctonia blight (brown patch) is incited by the fungus *Rhizoctonia solani*. This organism is pathogenic to over 1,800 plant species. Its grass hosts include all of the major warm season and cool season turfgrasses.

Rhizoctonia blight ranks as one of the most important diseases of turf and lawn grasses in the humid sections of the continental U.S.

In these areas, it is one of the more common diseases of bentgrass putting greens and bowling greens, and is often a cause of extensive blighting of Kentucky bluegrass lawns, athletic fields, and golf course fairways. In addition, from the Midwest to the Eastern seaboard, rhizoctonia blight is usually the most serious disease problem of tall fescue during July and August. During humid weather in the South, it can cause cause major damage to stands of zoysia and St. Augustinegrass.

The overall symptom patterns of rhizoctonia blight vary somewhat depending on the height of cut, the turfgrass type, and prevailing climatic conditions.

On bentgrass putting greens and bowling greens, its symptom pattern is characterized by irregularly-shaped patches of blighted grass ranging from a few inches to two feet in diameter. The coloration of these patches is usually first a purplish green, which rapidly fades to light brown as the leaves wither and dry out.

During warm, humid weather, dark, purplish "smoke rings," ½ to two inches in diameter, may border the diseased areas. These "halos" are usually more prominent in the early morning hours and may disappear as the day progresses.

On tall-cut grass maintained with grounds, golf course fairway, or home lawn management practices, the initial symptoms of rhizoctonia blight are irregularly blighted grass areas, ranging in size from a few inches to several feet in diameter. In the early development stages, the affected patches often develop as circular areas of dull tan to brown grass one to three feet in diameter with center areas of green, apparently unaffected plants—thus producing a "frog-eye" pattern.

The individual leaf symptoms of rhizoctonia blight on tall-cut grass are distinctive. They first appear as small, dull tan lesions. As they enlarge, they develop reddish-brown margins. Individual lesions may expand to envelop large sections of the leaf.

When this happens, in contrast to the symptoms of pythium blight, the integrity of the affected leaf tissue remains intact. In other words, instead of becoming softened, twisted, and matted together as in the case of pythium blight, leaves affected by rhizoctonia blight tend to retain their original shape and take on a dull tan to light brown, "dried out" appearance.

The infection of turfgrass leaves by *Rhizoctonia solani* begins when air

Melanotus white patch is more severe on young tall fescue.

temperatures reach the low 70s (degrees F). When the daily air temperatures move into the mid 80s, infection rates increase significantly and the extent of colonization of the leaves by the invading fungus becomes more pronounced.

Free water on the surface of the leaves is an important factor in producing maximum infections. When the air temperatures are in the low-to-mid 70s, continuous leaf wetting for a period of 36-48 hours is necessary in order for a high order of infections to occur.

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However, when the air temperatures are in the mid to high 80s, a high incidence of infections can occur within eight to 12 hours. The severity of rhizoctonia blight is much greater on grass grown under high nitrogen fertilization.

Soil moisture stress in the readily available range (field capacity to permanent wilting percentage) does not affect disease development. Market-available fungicides labeled for rhizoctonia blight control include Actidione Thiram, Chipco 26019, and Daconil 2787.

In areas where outbreaks are a recurring problem, a preventive spray program is necessary if consistent control of the disease is to be accomplished.

As a general rule, the initial fungicide application should be made immediately after the first night where air temperatures do not drop below 70 degrees F.

Melanotus white patch

Melanotus white patch is caused by the fungus *Melanotus phillipsii*. To date, the disease has been observed only on tall fescue.

Outbreaks of white patch have been reported in Virginia, Georgia, North Carolina, Kentucky, Tennessee, and Alabama. However, it is highly probable that this disease is more widespread but has not yet been identified in other areas.

In the early stages of development, melanotus white patch is seen as circular patches of blighted turfgrass three to five inches in diameter but may enlarge to eight to 14 inches. These initial sites of disease development often coalesce to involve large areas of turfgrass.

In overall view, these affected areas have a distinctive off-white color. Also, the individual patches may be surrounded by a salmon-pink border. The grass leaves within the patches may mat together and become closely pressed to the soil surface.

The disease is restricted to the leaf blades, with the crowns of the plants unaffected. This means that with the return of cooler growing temperatures, total recovery of the affected plants usually occurs.

Beginning first at the tip and then progressing downward toward the sheath, the individual grass leaves assume a light tan to bleached white color. Both the mycelium and the fruiting bodies of the causal fungus occur commonly on the surfaces of the affected leaves. The mycelium is seen as a grayish-white cobwebby growth on the leaves.

The fruiting structures are very distinctive and therefore, serve as a valuable aid in diagnosis. These are small grayish- white mushroom-like bodies, 1/16-to-5/16 inch in diameter. They develop initially as small round balls. Eventually, they open and the familiar gills found on mushrooms are apparent on their lower sides.

Melanotus white patch is more severe on tall fescue stands that are less than a year old. Also, heavily seeded grass is usually more severely affected by the disease than grass seeded at a normal rate.

The development of white patch is favored by hot, humid weather. Damage from the disease is greatest when the daytime air temperatures exceed 85 degrees F and the night temperatures do not fall below 70.

In a given stand of grass, the most severe level of disease development occurs in the areas exposed to full sunlight rather than shaded areas.

Outbreaks of white patch are heaviest under conditions of low soil moisture content. In field trials, commercially available fungicides have failed to control melanotus white patch.

Certain cultural practices are helpful, however, in reducing disease severity. Since white patch is favored by hot, dry weather conditions, watering the stand of grass during these times to promote adequate plant growth will alleviate the problem to some extent.

In addition, while establishing new stands of grass, or when overseeding with tall fescue, one should take care to stay within the recommended seeding rate.

Summer Patch

To date, a dying-out of turfgrass referred to as "summer patch" has been reported on Kentucky bluegrass in New York. It also has been suggested that a similar disease pattern may be occurring in other northeastern states and in certain midwest states.

Outbreaks of summer patch reportedly develop in July and August during prolonged periods of hot weather. The symptoms reported include irregular patches of dull tan to brown grass. The individual areas may be more or less circular in outline and extend up to several feet in diameter.

Within the diseased stand of grass, there may be areas that show the basic frog-eye pattern of patches of blighted grass with center tufts of apparently healthy plants. Recent research at Cornell University indicates that the summer patch condition may be brought on by periods of temperature stress combined with close mowing or other management-induced stresses, and then the colonization of the weakened plants by the fungus *Phialophora graminicola*.

Rhizoctonia blight ranks as one of the most important diseases of turf and lawn grasses in the humid sections of the continental U.S.

This particular fungus species is commonly found in association with the root systems of grasses. Its potential for affecting the health of grass plants has been the subject of considerable research by plant pathologists in England.

English research has demonstrated that *Phialophora graminicola* is a very weak plant pathogen. Furthermore, it has been found that when this fungus is placed in the soil, not only does it not harm the turfgrass, but it protects the plants from infection by the take-all pathogen *Gaeumannomyces graminis*.

Also, when the soil of stands of fescue and bentgrass is infested with *Phialophora graminicola*, the growth rates of the plants increase significantly, perhaps due to the fact that the fungus enhances nutrient uptake by the root systems.

The inoculation techniques that have been used in the Cornell pathogenicity tests with *Phialophora graminicola* have involved growing conditions that placed the plants under extreme stress.

For example, one set of experiments was conducted on seven-year-old Kentucky bluegrass field-grown sod cut at a depth of 3/4-inch and then placed over a 3/8-inch layer of soil in plastic containers.

These plants were then held in growth chambers under a continuous day-night air temperature of 85 degrees F for 15 weeks. Under these conditions, the mortality rate among the test plants was high.

These various research findings place summer patch in the category of symptoms known as senescence syndromes.

The symptom patterns in this grouping are caused by a combination of acute plant stress from weather and/or management practices followed by colonization of the weakened plant tissue by various micro-organisms. Examples of other senescence syndrome patterns in turfgrasses are Curvularia blight and anthracnose.

The senescence syndromes sometimes place the diagnostician in a dilemma. For the question that must be answered is whether or not the invading fungi or bacteria are actually compounding the stress-induced problem by introducing an added measure of tissue degradation, or if the initial environmental pressure was severe enough in itself to lead to the ultimate death of the affected leaf, crown, or root system.

If the micro-organisms that are found in the diseased plant are indeed compounding the stress-induced phase of the problem by introducing an added measure of tissue breakdown, then the use of a pesticide might be in order.

However, if the initial stress that has been placed on the plant is severe enough in its own right to bring about death, then the establishment of a spray program to control the micro-organisms would be a waste of time and money.

Much more field and laboratory research is needed before the cause and nature of the condition being referred to as "summer patch" is adequately understood and a positive determination can be made as to whether the use of fungicides to control the disease is feasable.

In the meantime, in situations where it has been decided that the problem at hand is summer patch, the best advice on fungicidal control that can be given is that if these attempts are made, one should keep the expectations for their success to a minimum. **WT&T**

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