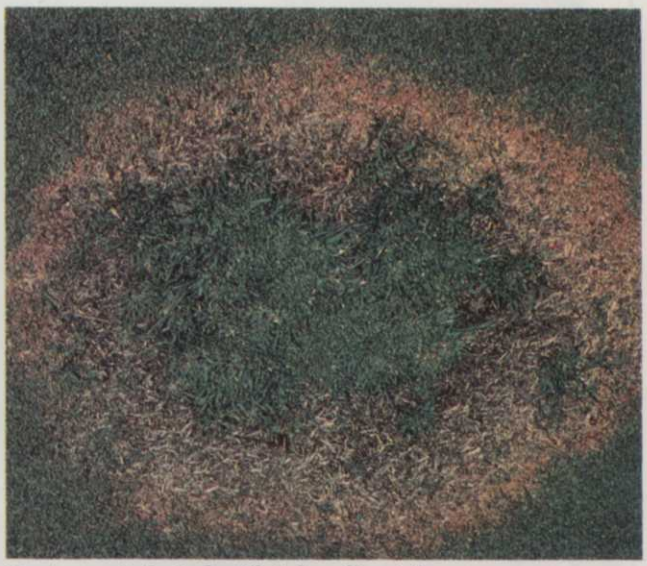
# THE PATCH DISEASES

## At least 17 exist and the symptoms of some are similar. A positive identification is necessary for control and treatment.

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

**Corticium red thread of Manhattan ryegrass.**



**Bentgrass infected with take-all patch.**

**Necrotic ring spot of Kentucky bluegrass.**

**Rhizoctonia yellow patch of Kentucky bluegrass.**

Turfgrass "patch" diseases are among the most difficult to diagnose.

The classic patch symptom pattern is characterized by the blighting of the majority of the leaves of the plants in a section of otherwise green turf.

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At present, there are 17 known patch diseases of turfgrasses. Various members of this disease group occur throughout the year on both warm- and cool-season grasses (see Table 1).

All of the complexities of diagnosis are highlighted within this group of diseases.

For example, some of the more dramatic symptoms associated with certain patch diseases can also be brought on by a variety of causes other than the pathogenic activity of microorganisms.

Plant stress caused by extremes in air temperatures, deficient or excessive soil moisture levels, improper mowing, or improper fertilization practices can also result in a browning of turfgrass in irregularly shaped patches.

In addition, the primary field diagnostic features for many of the patch diseases closely resemble each other. One symptom pattern, the "frog-eye" effect, is common to several of these diseases. It is roughly a circular area of blighted grass with a center of green, apparently healthy plants.

*continued on page 90*

**SPRING PATCHES,** *from page 86*

At present, nine patch diseases are known to be capable of producing this type of symptom: spring dead spot of bermudagrass; fusarium patch; rhizoctonia yellow patch; necrotic ring spot; take all patch; pythium blight; fusarium blight; rhizoctonia blight, and sclerotium blight.

At times, a positive diagnosis of a patch disease can only be made after there has been a thorough review of the environmental conditions preceeding problem development, an evaluation of the current management program for the grass (including mowing practices, fertilization rates and dates, watering practices, and the record of pesticide application), and a series of laboratory-based tests on diseased plant tissue and soil samples collected from the affected area.

In order to be successful in on-site identification of patch diseases, the identifier must:

1. Know what diseases could be occurring in the stand of grass at the time in question;
2. Be familiar with all of the primary and secondary field symptoms of each of these diseases;
3. Be able to recognize the particular field symptom patterns unique to each disease.

In this article we will review the key diagnostic features of the spring patch diseases of turfgrasses, highlight the weather and management conditions that favor their development, and give the control practices for each.

### Necrotic ring spot

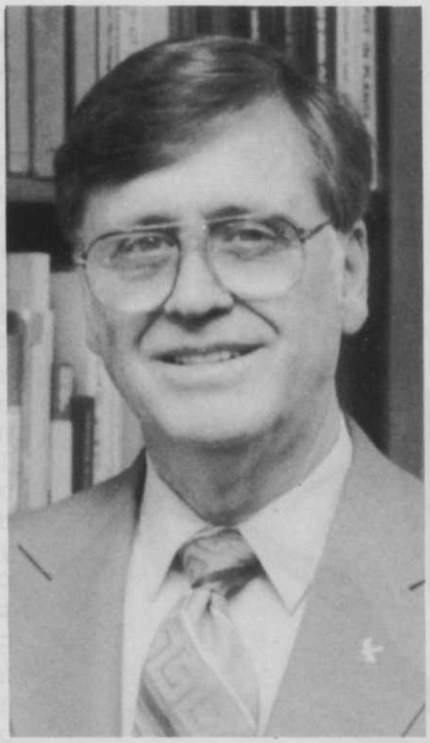
Necrotic ring spot is a newly recognized disease of turfgrass in North America, reported from the Pacific northwest, northeast, and north central sections of the U.S.

This disease is particularly destructive to Kentucky bluegrass and bentgrass, but also affects ryegrass, red fescue, tall fescue, and chewings fescue.

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

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.

When these patches first develop, the extent of leaf blighting within them is usually universal. However, many of the affected areas soon assume a distinctive "frog-eye" appearance.



**Dr. Houston Couch**

*One symptom pattern, the 'frog-eye' effect, is common to several of these diseases. It is roughly a circular area of blighted grass with a center of green, apparently healthy plants.*

At times, the initial sites of disease may coalesce to form large, irregularly-shaped zones of blighted grass.

Under weather conditions favorable for necrotic ring spot, reddish-brown borders may develop between the patches of dead plants and the adjacent healthy grass.

Also, the thatch may decompose rapidly in the patch areas, leaving depressions that give a "sunken pocket" appearence to the turf.

Necrotic ring spot is incited by *Leptosphaeria korrae*. Laboratory examination of the diseased plants reveal the dark brown strands (mycelium) of the fungus growing over the surface of the crowns and roots.

This can be a valuable aid to diagnosis, but must be used with some caution, for the fungus that incites take-all patch also produces similar structures on the root and crown surfaces.

Development of necrotic ring spot generally occurs during the cool, wet weather of spring and fall. During April and May, heavy outbreaks of the disease have been noted after prolonged periods of rainfall.

Field research reports from Washington 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.

### Take-all patch

Take-all patch (ophiobolus patch) affects Kentucky bluegrass, ryegrass, red fescue, tall fescue, and bentgrass. It is generally considered to be only a serious problem in bentgrasses.

New outbreaks, usually appearing in late spring, are characterized by dead spots of grass a few inches in diameter. Initially, under stress conditions, the leaves of affected plants may range in color from bronze to a bright reddish brown. Eventually, they fade to a light tan.

In time, these areas may increase to two feet or more in width, and develop "frog-eye" patterns as the centers are invaded by the more resistant grass species.

Ultimately, the roots of affected plants will rot. Therefore, during the final stage of disease development, the plants are easily pulled loose from the soil.

Outbreaks of take-all patch are most severe during periods of prolonged rainfall. The disease will usually first appear along drainage slopes, in low areas, or in locations where there has been excessive irrigation.

Although initial outbreaks usually occur during cool, moist growing conditions, often times the overall symptoms will continue to increase in severity during periods of stress from hot, dry weather.

Take-all patch is more severe when the soil is alkaline. The disease will be more prevalent on grass growing in soils that are light-textured, low in organic matter, or low or unbalanced with respect to nitrogen, phosphorous, and potassium.

Take-all patch is most severe on bentgrass that has been seeded on recently-fumigated soil.

Take-all patch is incited by *Gaeumannomyces graminis* var. *avenae*. This fungus produces dark brown thread-like strands (mycelium) on the surface of the diseased roots and lower leaf sheaths, serving as an aid in laboratory diagnosis. One must distinguish it from similar structures produced by the fungus that

*continued on page 96*

**TABLE 1**

**Patch Diseases of Turfgrasses**

| Disease and Season of Occurrence | Susceptible Grasses | Incitant |
|---|---|---|
| **I. WINTER** | | |
| Spring Dead Spot | Bermudagrass | *Leptosphaeria korrae* in certain areas |
| Typhula Blight | annual bluegrass, Kentucky bluegrass, perennial ryegrass, red fescue, tall fescue | *Typhula incarnata*<br>*Typhula ishikariensis* |
| Fusarium Patch | annual bluegrass, bentgrasses, Bermudagrass, Kentucky bluegrass, red fescue, ryegrasses, tall fescue | *Fusarium nivale* |
| Sclerotinia Patch | Kentucky bluegrass, red fescue, perennial ryegrass | *Myriosclerotia borealis* |
| Winter Crown Rot | creeping bentgrass, Kentucky bluegrass, red fescue, tall fescue | *Coprinus psychromoribidus* |
| **II. SPRING AND FALL** | | |
| Necrotic Ring Spot | bentgrasses, Kentucky bluegrass, tall fescue, red fescue, chewings fescue, ryegrasses | *Leptosphaeria korrae* |
| Take-All Patch (Ophilobolus Patch) | bentgrasses, Kentucky bluegrass, red fescue, tall fescue, ryegrasses | *Gaeumannomyces graminis* var. *avenae* |
| Rhizoctonia Yellow Patch | creeping bentgrass, Bermudagrass, Kentucky bluegrass, tall fescue, zoysia | *Rhizoctonia cerealis* |
| Corticium Red Thread | bentgrasses, Bermudagrass, Kentucky bluegrass, red fescue, perennial ryegrass | *Laetisaria fuciformis* |
| Liminomyces Pink Patch | red fescue, perennial ryegrass | *Liminomyces roseipellis* |
| **III. SUMMER** | | |
| Fusarium Blight | bentgrasses, Bermudagrass, centipedegrass, Kentucky bluegrass, red fescue, tall fescue, ryegrasses | *Fusarium culmorum*<br>*Fusarium poae* |
| Sclerotinia Dollar Spot | bentgrasses, Bermudagrass, Kentucky bluegrass, red fescue, centipedegrass, zoysia | *Sclerotinia homoeocarpa* |
| Sclerotium Blight | bentgrasses, Bermudagrass, Kentucky bluegrass. | *Sclerotium rolfsii* |
| Pythium Blight | bentgrasses, Bermudagrass, Kentucky bluegrass, red fescue, tall fescue, ryegrasses, zoysia, St. Augustinegrass | *Pythium ultimum*<br>*Pythium aphanidermatum* |
| Rhizoctonia Blight (Brown Patch) | bentgrasses, Bermudagrass, Kentucky bluegrass, red fescue, tall fescue, ryegrasses, zoysia, St. Augustinegrass | *Rhizoctonia solani* |
| Melanotus White Patch | tall fescue | *Melanotus phillipsii* |
| *Senescence Syndromes:* "Summer Patch" | Kentucky bluegrass | High air temperature stress + *Phialophora graminicola* (?) |

**SPRING PATCHES,** *from page 90*

causes necrotic ring spot.

None of the currently available fungicides are effective in controlling take-all patch. The most appropriate approach to dealing with disease outbreaks is to follow management practices designed to promote early recovery of the turf.

### Rhizoctonia yellow patch

Rhizoctonia yellow patch, caused by *Rhizoctonia cerealis*, can be destructive to Kentucky bluegrass, but causes only slight to moderate damage to creeping bentgrass, tall fescue, bermudagrass, and zoysiagrass.

In the early stages of disease development, the affected turf develops light green to distinctly yellow-green patches two-to-three inches in diameter. As the disease progresses in Kentucky bluegrass, the color of affected areas fade to a light tan to brown and the size of individual patches may extend up to three feet wide.

*...patch diseases can be brought on by a variety of causes other than the pathogenic activity of microorganisms.*

With bentgrass, tall fescue, bermudagrass, and zoysiagrass, the color of the patches may remain yellow-green for several weeks, but fail to turn brown. Eventually, these plants may fully recover.

The "frog-eye" symptom pattern of distinct rings of yellow-green to brown grass with center areas of healthy-appearing grass is common for rhizoctonia yellow patch.

These patches often have a pronounced sunken appearance due to the rapid decomposition of the thatch.

Under conditions favorable for development of the disease, the leaves of the plants near the margins of patches will frequently have a characteristic reddish to reddish-purple tint, beginning at the leaf tip and moving progressively toward the sheath.

Another characteristic feature of diseased leaves prior to complete blighting is the presence of tan lesions with dark brown borders.

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

The development of rhizoctonia yellow patch is favored by cool wet weather, primarily the 40 to 60 degrees F range.

When the leaf symptoms are in the early chlorosis stage of development, symptoms will disappear if temperatures drop below 40 degrees F or go above 75.

However, if the temperatures stay within the 40-60 degree range, the disease will progress to foliar blighting.

Attempts to control this disease with applications of fungicide have met with little success.

Research at Ohio State University has shown that Adelphi, Cheri, and Touchdown Kentucky bluegrasses are highly resistant to rhizoctonia yellow patch.

In the event of severe disease damage, overseeding the affected area with one of these cultivars will provide some protection against major outbreaks.

### Corticum red thread

Corticum red thread has the distinction of being the first recorded foliar disease of turfgrass.

The fungus that incites the disease (*Laetisaria fuciformis*) was first observed on ryegrass in Australia in 1854. Red thread was first reported in the U.S. in 1931

In overall view, corticium red thread is seen as irregularly-shaped patches of blighted turfgrass, ranging in size from two inches to three feet in diameter. In large affected areas, the patches have a generally ragged appearance due to a fairly high population of unaffected leaves.

The disease is confined to the leaves and leaf sheaths only. At the points of infection, there are small, water-soaked spots which rapidly enlarge, covering a large portion of the leaf or leaf sheath.

As these water-soaked lesions enlarge, there begins a general drying out of the affected tissue, and subsequently, a gradual fading to a tan color that eventually involves the entire leaf.

Under favorable conditions for disease development, the leaves may be completely covered with the pink gelatinous growth of the pathogen.

Field diagnosis of corticium red thread is easiest when the disease is in the final stages of development. At this time, the leaves are terminated by fine, thread-like structures, 1/16 to 1/4-inch in length that are a distinctive, bright, coral-pink color.

In recent years, another disease has been described that has many of the field diagnostic features of corticium red thread. The disease, Limonomyces pink patch, is incited by the fungus *Limonomyces roseipellis*.

It is believed only to occur on perennial ryegrass and creeping red fescue.

The main field pattern that distinguishes this disease from corticium red thread is that the coral pink tendrils at the leaf tips that are so characteristic of red thread are absent. Otherwise, many of the field diagnostic features are identical.

Limonomyces pink patch cannot be controlled with the the fungicides that are effective against corticium red thread. Thus, in cases where the reddish threads are not present, samples should be collected and sent to a laboratory for verification of which fungus species is actually inciting the disease in question.

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Optimum weather conditions for the development of corticium red thread are air temperatures in the 68-75 degrees F range, coupled with prolonged periods of rainfall.

Nitrogen fertilization has a very pronounced effect on the development of this disease. The incidence and severity of red thread is much lower when the plants are grown under high nitrogen fertilization.

Of the cultivated turfgrasses that are susceptible to corticium red thread, perennial ryegrass, creeping red fescue, and Kentucky bluegrass are most vulnerable.

With the perennial ryegrasses, the cultivars Linn and Citation are among the most resistant, while Pennfine, Omega, Manhattan, and Caprice rank with the most susceptible.

The fungicides Bayleton, Cleary 3336, Fungo 50, and Daconil 2787 are labeled for control of corticium red thread.

For optimum effectiveness, these materials should be used in conjunction with a program of nitrogen fertilization that is at the upper level of recommended pounds of available nitrogen per unit of turf area. **WT&T**

*Next month, Dr. Couch examines summer patch diseases.*