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DISEASE from page 40

ingly evident over the past few years that summer patch, caused by *Phialophora graminicola*, is a primary disease of annual bluegrass during warm weather. It can also be found on Kentucky bluegrass and fine-leaf fescues, especially in the warmer areas of the cool-season grass region.

On annual bluegrass, the initial symptoms are a yellowing of the turf in patches, usually six inches to one foot in diameter, followed by a thinning of the turf, with the remaining turf turning bronze in color. If warm weather persists, all the turf in the patches may die.

Most of the creeping bentgrass cultivars are resistant and creeping bentgrass frequently can be seen recolonizing the centers of these patches. Preliminary data indicate that soil temperature and soil moisture may be important in the development of this disease.

Both excessive and limiting soil moisture during periods of hot

weather may result in severe outbreaks of summer patch. Lighter and more frequent irrigations should help reduce the severity of summer patch.

Take-all patch. Take-all patch, caused by *Gaeumannomyces graminis* var. *avenae* was formerly known as ophiobolus patch caused by *O. graminis*. This disease was originally thought to be confined to the Pacific Northwest. It has now been reported throughout the United States and Canada wherever creeping bentgrass is grown.

Effective chemicals

Fungicides for the management of the patch diseases and how to use them are discussed below:

Benomyl, *thiophanate* and *thiophanate-methyl*. These fungicides will manage all three diseases. They are all basically the same chemistry as far as mode of action is concerned. They are also systemically translocated upward and outward from where they enter the plant. For

fungicides to be effective against these root pathogens, they need to be drenched into the soil where they can be taken up by the roots. If they are allowed to dry on the foliage, they will not manage the patch diseases.

For best results the area to be treated should be irrigated just prior to treatment.

Fenarimol. This fungicide will also manage all three patch diseases and does not need to be drenched in to be effective. For management of summer patch on annual bluegrass, treatments should be applied early in the season before the temperatures go into the 80 degrees Fahrenheit range on a permanent basis.

Iprodione. This fungicide is effective against necrotic ring spot and does not need to be drenched in to be effective.

Triadimefon. This fungicide is effective against summer patch and does not need to be drenched in to be effective. There are some reports in the literature that suggest this product is only effective against summer patch when applied as a preventive treatment. **LM**

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PLANT PROTECTION

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WARM-SEASON TURF DISEASES

by Dr. Don Blasingame, Mississippi State University

Managers of southern turf not only fight diseases of six different warm-season turf species, but also diseases of overseeded cool-season turf species.

Although most southern turf diseases are caused by fungi, agents such as bacteria, viruses and nematodes can cause serious problems to certain grasses.

Southern turf managers can't depend solely on fungicides for disease control. Good variety selection, proper fertilization and appropriate cultural practices are very important in disease control.

No amount of fungicide will compensate for poor fertility and cultural practices. Knowing when the most common diseases occur also will aid managers in scheduling fungicide applications (see chart).

Brown patch

Brown patch is the most common turf

disease in the Southeast. Although St. Augustine and zoysiagrass are the most susceptible species, even the more tolerant centipedegrass, Bermudagrass and ryegrass are frequently damaged by this fungus.

Brown patch is favored by warm, moist weather combined with cool nighttime temperatures. Therefore, in certain areas of the South, brown patch can and does occur any month of the year.

In the upper regions of the South, the most favorable conditions for brown patch development occur from late April through mid-October.

Symptoms of brown patch on warm-season grasses are different than the symptoms of the disease on cool-season turf. Even though the grass is usually killed in a circular pattern, many times the smoke ring is not seen on southern turf.

Under certain conditions the fungus may cause a gradual thinning

of the turf over a rather large area instead of killing in a circular pattern.

Several factors tend to make the grass more susceptible to brown patch. One is the excessive application of nitrogen fertilizer. The resulting lush growth is readily attacked.

Another is watering late in the afternoon and allowing the grass to remain wet for long periods of time. Excessive accumulation of thatch also creates a favorable environment for the development of brown patch and many other diseases.

Fungicides are best used on a preventive schedule. Once symptoms develop, control can be difficult.

Dollar spot

Dollar spot is common on Bermudagrass, zoysiagrass and annual and perennial bluegrasses.

Symptoms of dollar spot are different on certain warm-season grasses than those noted on cool-season grasses.

On finer textured grasses, such as Bermudagrass and zoysiagrass, the disease kills grass in small patches two to three inches in diameter. Under severe conditions, these patches may coalesce so that the turf has a mottled appearance. Blades of grass at the outer edges of the infected area develop tan spots with reddish brown margins.

On coarser warm-season grasses, turf is killed in larger patches ranging up to a foot in diameter.

Dollar spot is prevalent during periods of mild weather in the spring and fall.

Unlike brown patch, dollar spot is retarded by high levels of nitrogen. Still, turf managers should consider the impact of high nitrogen on brown patch and other diseases.

continued on page 48

Spring dead spot is a serious disease of Bermudagrass in the upper sunbelt.





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WARM SEASON from page 46

Watering should be performed only in the early morning so the foliage can dry quickly. Fungicides can be used to help bring the disease under control once it gets established.

Leaf spots

A number of fungi cause leaf spots on many southern grasses. Regardless of the causal agent, leaf spots and their control on southern grasses are similar.

Melting out (*Bipolaris* spp.)—Bermudagrass and ryegrass are most severely affected by these infections, although the fungus can survive on centipedegrass and St. Augustine.

Infection can occur over a wide range of temperature, but usually is more severe at 70 to 95 degrees Fahr-

enheit. Milder temperatures in the spring and fall are more favorable for infection.

Melting out causes small, dark-colored spots or flecks on the leaves and sheaths. Leaf spots are usually more numerous near the collar of the leaf blades. Severely affected leaves wither and die and the turf frequently becomes brown and thin.

Symptoms on overseeded ryegrass are altogether different. Although leaf spots may occur, this same melting out can cause severe crown rot. This causes a yellowing and discoloration of the grass and a general thinning of the turf.

Fertilize with adequate levels of nitrogen and potassium if melting out diseases become a problem. With

careful management, apply fungicides recommended for melting out blight control.

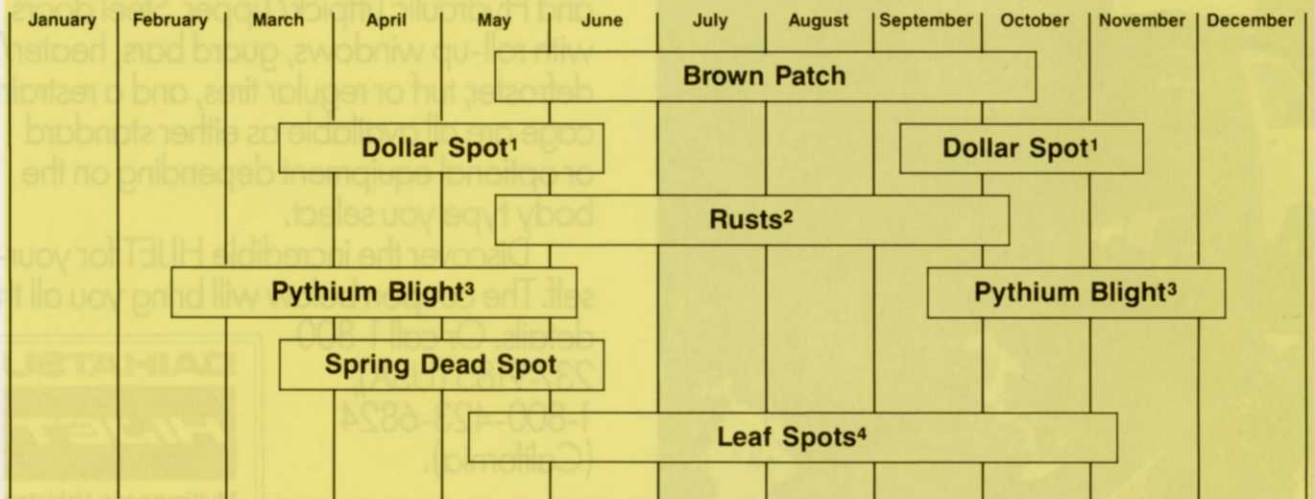
Gray leaf spots—St. Augustinegrass is the primary host for gray leaf spot. The disease occurs throughout the lower South during warm, humid weather.

Spots on the leaf blades are the most visible, but sheath and stem lesions also occur. Leaf spots begin as olive green to brown, water-soaked spots as small as a pinhead. These enlarge rapidly and form a circular to elongated lesion that is brown to ash colored with purple margins.

The disease occurs during moderate to warm weather accompanied by high relative humidity. Severity of the disease is enhanced by applica-

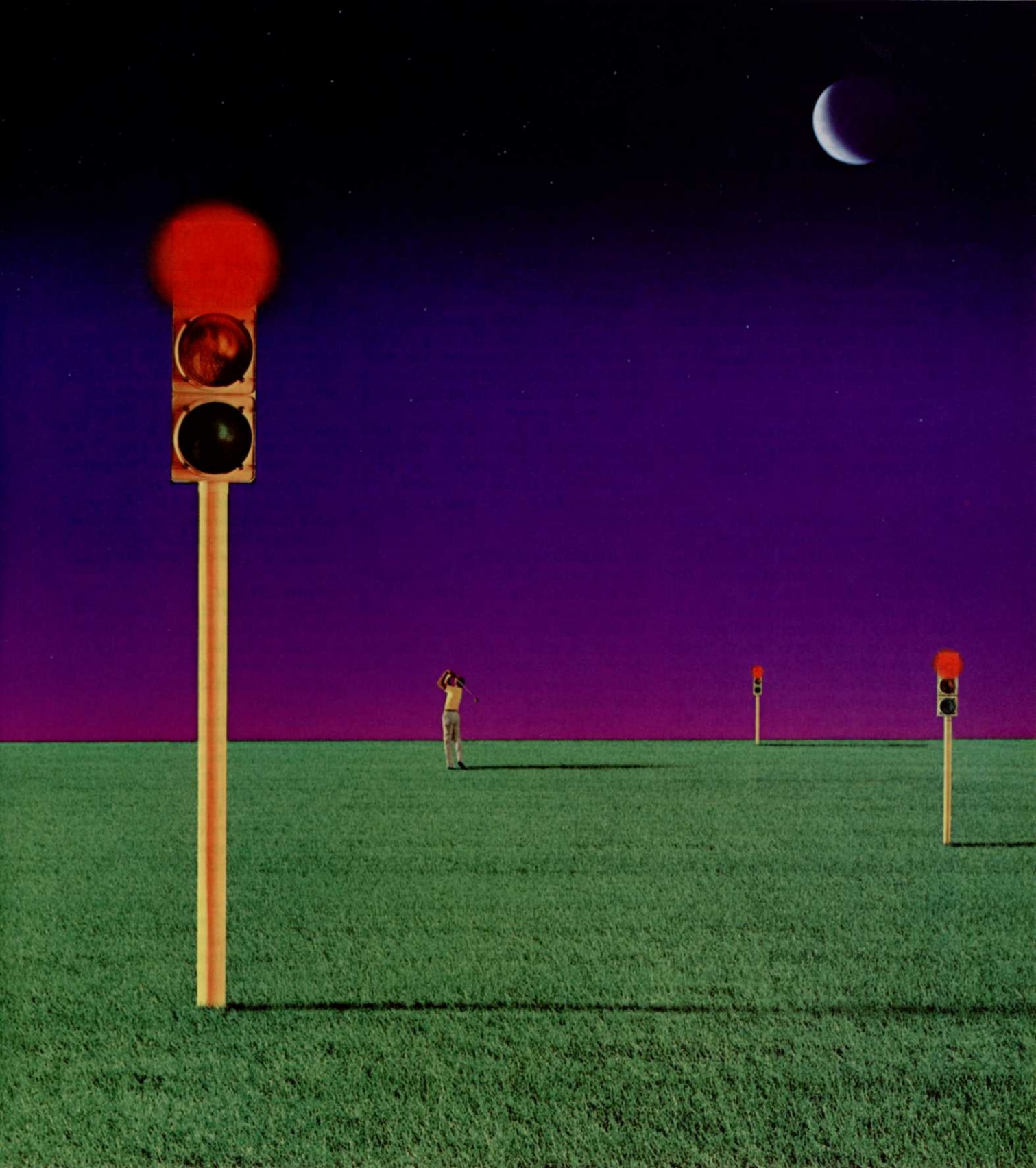
CALENDAR

Major Diseases of Warm-Season Turf*



* The calendar gives the normal time for turf diseases to occur. However, they may occur at other times depending upon environmental conditions.

- 1 - Dollar spot affects overseeded turf as well as warm-season grasses.
- 2 - Rust does affect overseeded grasses but is most common on zoysiagrass.
- 3 - Pythium blight is most damaging on overseeded turf but can cause damage to warm-season turf especially during "transition" periods.
- 4 - Most warm-season grasses are affected by certain leaf spots. For example: gray leaf spot of St. Augustine and the helminthosporium complex on Bermudagrass.



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tions of nitrogen fertilizer. It is more a problem in shaded areas where the grass remains wet from dew.

Treatment with a fungicide may become necessary if the disease outbreak is severe and accompanied by prolonged periods of wet favorable weather.

The fungicides chlorothalonil, mancozeb and cycloheximide plus thiram have been found to be effective in controlling gray leaf spot.

Rust

Rust or *Puccinia* species infect ryegrass, zoysiagrass, bluegrass, fescue, Bermudagrass and St. Augustine. Zoysiagrass and bluegrass are the most often infected grasses.

Susceptibility depends on the variety. Fungus infection is favored by minimum and maximum temperatures of 50 to 70 degrees Fahrenheit respectively. For this reason, the disease does not usually cause severe damage over an extended period. It is likely to be more severe in shaded areas during rainy, humid weather. Affected turf will appear unthrifty and begin to thin.

The disease is characterized by the presence of pustules on the leaf blades. These pustules range from bright orange to cinnamon-brown in color depending upon the species of fungus present.

Certain varieties of ryegrass are extremely susceptible to rust, and sometimes severe damage can occur. Zoysiagrass, especially Meyer and Emerald, are most severely infected by rust.

Fertilize to stimulate grass growth, mow on a four- to five- day schedule and catch clippings. If necessary, a fungicide may be applied to help reduce the amount of disease present.

Triadimefon, chlorothalonil, mancozeb and cycloheximide are effective in controlling rust.

Spring dead spot

Spring dead spot is a serious disease of Bermudagrass in certain parts of the upper sunbelt. It is found generally on Bermudagrass or zoysiagrass under high maintenance.

Damage to the turf apparently occurs during the dormant season. When greenup occurs in the spring,

areas a few inches to several feet in diameter appear where the sod is completely dead.

Spring dead spots' causal agent has not been identified. The only control procedures recommended are good cultural practices and limiting the use of nitrogen fertilizer, especially late in the growing season.

Research has shown that fungicides can limit the damage. However, at the present time only benomyl and PCNB are labeled, and these may be limited uses in certain states.

St. Augustine decline

St. Augustine decline (SAD) is caused by a virus. The symptoms are a mosaic-type chlorosis of the leaf blades that resemble nutrient deficiency or mite feeding. Evidently there are several strains of the virus since there is a great range in damage to St. Augustine.

To this point, the disease has only

Turf managers should consider the impact of high nitrogen on brown patch and other diseases.



Spores of the melting out fungus can easily be spread by wind, rain and equipment.

been recorded in Arkansas, Texas, Louisiana and Mississippi. No chemicals are available for the control of SAD.

Several varieties of St. Augustine, however, are resistant to the virus. These can be planted in areas where the disease is a potential problem.

Floritam was the first variety released with resistance to SAD. It is also resistant to chinch bugs. It has poor cold tolerance and should be used only in the lower South.

Seville is resistant to SAD and is more shade tolerant than common St. Augustine. Raleigh has both SAD resistance and good winter hardiness.

Downy mildew

Downy mildew of St. Augustine was first described on common St. Augustine in Texas in 1969. Since then the disease has spread and has been identified in Arkansas, Louisiana and Mississippi.

Downy mildew appears as white, raised, linear streaks that develop parallel to the mid-veins of the leaf. Streaks appear in the spring and remain throughout the summer, giving the leaves a yellow appearance with some death toward the tips.

Severe disease occurs in grass grown in flood plains or poorly drained areas.

The white-streak symptom is easily confused with the virus disease, St. Augustine decline. However, the virus symptoms are more yellow in color and more mottled than striped.

Downy mildew has been difficult to control with most common turf fungicides. Good drainage is recommended for cultural control.

Pythium blight

Pythium blight can be a devastating disease on overseeded ryegrasses. Bermudagrass and other warm-season grasses can be affected to a lesser degree.

An abundance of moisture is required for pythium blight development. In addition, the disease is favored by warm temperatures.

Affected grass is killed rapidly in spots two to four inches in diameter. These spots may develop into streaks so that large areas of turf are damaged.

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