

Leaf Spot and Rust Diseases of Turfgrasses

ANR-621

The warm- and cool-season turfgrasses widely grown in Alabama are subject to attack by many diseases. Although the damage associated with many diseases is cosmetic, any reduction in turf quality or stand density is unacceptable, especially on intensively managed turfs such as golf course greens and tees. Regular inspection, correct diagnosis, and proper management practices are essential for healthy turf.

Leaf Spot and Crown Rot Diseases

Leaf spot and crown rot encompass a group of similar diseases commonly found on most warm- and cool-season turfgrasses. The causal fungi, which once were all included in the genus *Helminthosporium*, have now been placed in the genera *Bipolaris*, *Exserohilum*, and *Drechslera*.

The severity of leaf spot and crown rot diseases is governed by the type of turf grown, the weather patterns when disease is likely to occur, and the management practices used.

In Alabama, the worst leaf spot and crown rot outbreaks are usually seen on common bermudagrass lawns; most hybrid bermudagrass cultivars rarely suffer serious injury. Considerable stand thinning often occurs on turf-type tall fescue in sod production and landscape settings. Leaf spot and crown rot diseases also occur on perennial ryegrass, bentgrass, and zoysiagrass. Their occurrence on these turfs has often been sporadic and the damage minimal. Leaf spot and crown rot are likely to occur during periods of clouds and showers alternating with dry conditions. Other factors that increase the severity of leaf spot and crown rot diseases on warm- and cool-season turfgrasses include low potassium (potash) fertility, use of excessive rates of soluble nitrogen fertilizers, applications of phenoxy herbicides, heavy shading, and close mowing of susceptible cultivars.

Symptoms

Leaf spot and crown rot fungi are capable of heavily damaging only a few specific turfgrasses. The leaves, leaf sheaths, crowns, and roots of the



Figure 1. Typical purple to brown streaklike spots associated with leaf spot and crown rot on common bermudagrass.

host turfgrass may be attacked. Typically, leaf spot and crown rot diseases are characterized by distinct leaf spots (Figure 1), followed by a gradual thinning or melting out of the affected turf (Figure 2). Table 1 lists the symptoms of the leaf spot and crown rot diseases on specific warm- and cool-season turfgrasses commonly grown in Alabama.

Disease Cycle

Leaf spot and crown rot fungi overseason in infected host tissues and leaf debris. Numerous spores of these fungi form within 1 to 2 days after dry infected leaf clippings are rewet. Sparse spore



Figure 2. Nondescript thinning or melting out of leaf spot- and crown rot-damaged bermudagrass lawn

production is usually seen inside the spots on living leaves. These spores are dispersed to nearby healthy leaves primarily by wind currents, but water, grass clippings, and foot traffic may also be involved in the spread of these fungi. Infection of the leaves usually occurs within 12 hours when a film of moisture is present on leaf surfaces. Depending on moisture and temperature, typical leaf spot symptoms will usually be seen 3 to 7 days later. The longer the leaves remain wet, the larger the spots will be.

Disease development is generally favored by alternating periods of wet and dry weather. Occasional showers or watering provide enough moisture for pathogen activity. On cool-season turfgrass, damage usually occurs from November through May. In Alabama, net blotch on tall fescue has been particularly destructive on newly established sod fields in December and January. Leaf spot and crown rot diseases may be seen on warm-season turfgrasses beginning in midsummer through early fall. Sharp declines in the quality of common bermudagrass lawns due to leaf spot and crown rot are usually most noticeable in August and September.

Control

The nutritional status of the turf may play an important role in the development of leaf spot and crown rot diseases. To promote good turf vigor and reduce the impact of disease on turf quality, maintain soil pH and balanced fertility according to soil test recommendations. Overuse of nitrogen fertilizers can increase the susceptibility of cool-season turfgrasses to these diseases. Reduce the impact of nitrogen fertility by making light, frequent applications of a soluble nitrogen fertilizer, or use a slow-release nitrogen source. Also, maintaining optimum potassium levels for turf growth is critical in preventing severe disease outbreaks on common bermudagrass turfs.

Mowing height may influence disease development, particularly on cool-season turfgrasses. Damage to these turfgrasses is often worse on closely clipped lawns. Mow cool- and warm-season turfgrasses at recommended cutting heights. Mow often enough so no more than one-third of the leaf area is removed at any one time. During dry weather, raise cutting heights slightly to reduce turf stress and

Table 1. Common Leaf Spot and Crown Rot Diseases of Alabama Turfgrasses

Turfgrass	Symptoms
Bermudagrass	Small purple to brown streaklike spots on leaves and leaf sheaths are associated with leaf spot caused by <i>Bipolaris cynodontis</i> and <i>Exserohilum rostrata</i> . Similar spots may also be seen on the crowns and stolons. Distinct eyespots having yellow or tan centers with brown margins, sometimes occurring in concentric rings, may be seen on leaves damaged by <i>Drechslera gigantea</i> . These spots may become large enough to girdle and kill the entire leaf. Once the streaks or spots become numerous, the affected leaves turn yellow, wither, and die. Considerable thinning of the turf in large irregular patches is usually seen. Usually occurs in late summer to early fall.
Zoysiagrass	A gradual thinning of the turf canopy is typically associated with a stem and crown rot caused by <i>Bipolaris tetramera</i> . Small brown spots occur on the stems. A dark, dry rot of the stolons and roots may also be seen. Diseased plants have unthrifty and chlorotic (yellowed) leaves. This fungus is also found on bermudagrass.
Tall Fescue	Small brown spots with yellow margins are the first symptoms of infection of tall fescue leaves by <i>Drechslera dictyoides</i> . Later, these spots merge to form a netlike pattern of thin, threadlike brown lines on the leaves, hence the name "net blotch." Affected leaves usually turn yellow and gradually wither from the leaf tip. Severely damaged turf has a yellowish cast and is noticeably thinned. Common on tall fescue sod fields in late fall into early spring.
Ryegrass	First symptoms of brown spot caused by <i>Drechslera siccans</i> are small, circular brown spots on the leaves. As they enlarge, these spots develop tan centers and brown margins. Brown streaks may also appear between the leaf veins. Once the spots become numerous, the leaves typically will wither and die, starting at the leaf tips. Net blotch is also reported on perennial ryegrass. Several other <i>Drechslera</i> species are known to cause leaf spot diseases of ryegrass but are of minor importance. Usually occurs in late fall or early spring.
Bentgrass	Small, round, brown to reddish brown eyespots, sometimes with tan centers, occur on the leaves. Irregular blotches may also be seen, particularly on the finer-leaved bentgrasses attacked by <i>Drechslera erythospila</i> . During wet weather, a water-soaked halo may be found surrounding a leaf spot. Diseased leaves are often girdled by enlarging leaf spots or blotches; tissues above the spots then wither and die. Many withered leaves in the turf canopy of severely damaged bentgrass may give the turf a dull or smoky cast.

susceptibility to disease. When symptoms are seen, remove the clippings after mowing lawns previously damaged by leaf spot and crown rot.

Other practices that may check disease spread are yearly core aeration, or vertical mowing, and timely watering during periods of dry weather. Water turf thoroughly in the late evening or before mid-day to minimize the length of time the turf foliage is wet. Refer to Extension publication ANR-239, "Lawn Maintenance in Alabama," for additional information on fertilization, watering, and mowing practices for turfgrasses commonly grown in Alabama.

Establishment of a disease-resistant turfgrass is one of the best control strategies for leaf spot and crown rot diseases. Hybrid bermudagrasses, such as Tifway II and Tifgreen, are far less likely to be damaged by leaf spot and crown rot than are seeded bermudagrasses, such as Common, Sonesta, Cheyenne, Sundevil, and Sahara. Among the more resistant perennial ryegrass cultivars are Manhattan II, Rebel, Birdie II, Cowboy, Derby, Diplomat, Gator, and Regal. Perennial ryegrass cultivars suffering the worst disease-related damage in the National Perennial Ryegrass Test were Linn and Yorktown II. Rebel turf-type tall fescue has suffered heavy net blotch damage on several Alabama sod farms. The reaction of bentgrass cultivars commonly used on golf greens in the Deep South to attack by *D. erythospila* is not known.

Generally, fungicides are needed only on those turfs where management practices have failed to check the spread of the disease. Commercial and leisure turf managers should record the occurrence and severity of disease outbreaks. This practice allows managers to target areas previously damaged by leaf spot and crown rot for treatment and to improve the timing of preventative fungicide applications.

Fungicides usually are most effective if preventative applications are begun when weather patterns favor disease but no fresh damage has been seen. When disease is severe, make several applications of the highest rate of a recommended fungicide on a shortened spray schedule. Further damage can then be avoided by following the preventative spray schedule and maintenance schedule described above. Always apply fungicides after the turf has been mowed, and allow the fungicide residues on the leaves to dry before irrigating the turf. Fungicide application rates and spray schedules are listed in Table 2 and in the Extension online publication ANR-500-B, *Alabama Pest Management Handbook*—Volume 2.

Rust

Rusts, which are caused by fungi in the genus *Puccinia*, occur on all commonly grown warm- and cool-season turfgrasses, and a few are responsible for significant stand losses. Among warm-season turfgrasses, zoysiagrass lawns are often the targets of severe rust damage, while bermudagrass, St. Augustinegrass, and centipedegrass lawns are far less likely to suffer serious injury. Perennial ryegrass is the most susceptible of commonly grown cool-season turfgrasses to rust, but the disease is rare on tall fescue and bentgrass. With few exceptions, the host range of rust fungi is limited to a few turfgrasses.

Drought stress, along with low nitrogen or imbalanced soil fertility, often increases the incidence of rust. Poor air circulation and increased dew persistence in shaded or protected sites may also result in heavier rust damage. Mild, humid weather conditions usually favor the development of rust. Rust usually peaks on zoysiagrass in May and again in July. Rust epidemics on perennial ryegrass usually occur in the spring and fall.

Symptoms

Small yellow flecks on the leaves and possibly on the leaf sheaths are the first signs of rust. Within several days, yellow to orange, raised pustules (uredinia) of most rust fungi appear in place of the yellow flecks (Figure 3). Brown pustules of bermudagrass rust are harder to identify than those of other rust fungi. The usually brightly colored, powdery spore mass found in the pustules readily clings to fingers and clothing. Leaves covered with numerous pustules turn yellow, wither, and die. Severe stand thinning may be seen on rust-susceptible turfgrasses. Pustules may be so numerous on the leaves that the diseased turf takes on a distinct yellow to orange cast (Figure 4).

Disease Cycle

Many rust fungi have complex life cycles with multiple spore stages that may include one or more broad-leaved host plants. In the U.S., zoysia rust, however, occurs only on zoysiagrass. Rust fungi survive in the tissues of perennial grasses or as spores. In addition, spores of a few rust fungi are spread across Alabama from the subtropics by wind currents. Weedy grasses may also be a source of some rust fungi, particularly those that attack cool-season turfgrasses.



Figure 3. Numerous orange pustules are found on leaves of rust-damaged Meyer zoysiagrass.



Figure 4. Rust-damaged turf often has an orange-yellow cast.

Infection occurs during periods of mild, wet weather. A film of water or dew, along with mild temperatures and possibly low light intensity, is needed for rapid infection of the host plant. Pustules usually appear on the leaves or leaf sheaths within 1 to 2 weeks of infection.

Control

Rust severity can be greatly reduced by maintaining recommended soil fertility and pH levels. Following nitrogen fertility recommendations is a critical factor in controlling rust on warm-season turfgrasses. Frequent mowing until symptoms disappear is also a highly effective control measure for rust diseases. Low cutting heights, which will stress the turf, must be avoided. Clippings from diseased turf should be discarded or composted.

During periods of dry weather, water rust-susceptible turfs frequently but thoroughly to maintain turf vigor. In shaded sites, selective pruning of trees and shrubs may also be required to increase sun-

light penetration and improve air circulation. Refer to Extension publication ANR-239, "Lawn Maintenance in Alabama," for additional information on fertilization, watering, and mowing practices for turfgrasses commonly grown in Alabama.

Selecting a rust-resistant cultivar can be an effective control strategy. Zoysiagrass is the only warm-season turfgrass consistently damaged by rust. Although all zoysiagrasses are susceptible to rust, Meyer and Emerald may suffer heavier damage than Matrella. The rarity of rust on bermudagrass and St. Augustinegrass shows that available cultivars apparently have very good rust resistance. Perennial ryegrass cultivars with good rust resistance include Elka, Tara, Gator, Ovation, Ranger, Prelude, Palmer, Repell, Blazer, Crown, Premier, Acclaim, and Manhattan II. Regal, Manhattan, Citation, Linn, and Derby perennial ryegrasses are highly sensitive to rust. Since rust on popular turf-type tall fescue and bentgrass cultivars is very unusual, special precautions concerning variety selection are not necessary.

Fungicides are recommended for rust control only on valuable leisure turfs or in situations where management practices have failed to check the spread of the disease. As with leaf spot and crown rot, fungicide applications should be timed to begin when or shortly before symptoms first appear. Applications should continue as long as conditions favor disease. Recovery of turf that has been severely damaged by rust will be slow once curative fungicide treatments have begun. Fungicide spray schedules for the control of rust diseases are similar to those described for leaf spot and crown rot diseases. Fungicides recommended for rust control are listed in Table 2 and in the Extension online publication ANR-500-B, *Alabama Pest Management Handbook*—Volume 2.

Gray Leaf Spot

Gray leaf spot, caused by the fungus *Pyricularia grisea*, occurs primarily on St. Augustinegrass. It is also occasionally seen on centipedegrass and bermudagrass. Disease development is favored by frequent showers, high temperatures, and excessive nitrogen fertilization. Gray leaf spot is usually most troublesome from June to August. Although this disease damages St. Augustinegrass in home, leisure, and commercial settings, it is most destructive in newly established sod production fields.

Symptoms

Small, round, gray-brown spots appear on the leaves and leaf sheaths. As these spots enlarge, their centers become light brown to gray, and the margins turn purple to brown (Figure 5). At times, a yellow border or halo may be seen around the leaf spot. Although these spots may appear anywhere on the leaf surface, they are usually concentrated along the leaf midvein. Heavily spotted leaves turn yellow, wither, and die. St. Augustinegrass stands may be severely thinned by gray leaf spot. Damaged turf may appear scorched due to the numerous yellowed, dying leaves in the turf canopy (Figure 6).



Figure 5. Gray leaf spot on St. Augustinegrass. Leaf spots have tan to light gray centers with brown to purple borders.



Figure 6. St. Augustinegrass damaged by gray leaf spot often appears scorched because of the death of numerous leaves.

Disease Cycle

The causal fungus of gray leaf spot overwinters in spots on host tissues and leaf debris. Spores produced on these spots are dispersed to nearby healthy leaves by splashing rain and wind. The disease develops rapidly when the turf is actively growing during periods of frequent showers at temperatures above 70 degrees F. Spots usually appear on the leaves

within 7 days of infection. Disease spread continues as long as weather conditions favor disease. Extended periods of dry weather will stop disease development. Heavy nitrogen fertilization increases St. Augustinegrass's susceptibility to gray leaf spot.

Control

The severity of gray leaf spot can often be moderated by making light, frequent applications of a fast-release nitrogen fertilizer or by using a slow-release nitrogen source. In addition, St. Augustinegrass should be watered at a time when the leaves will dry quickly. In particular, avoid watering in the early evening. Discard or compost turf clippings from turf damaged by gray leaf spot. Refer to Extension publication ANR-239, "Lawn Maintenance in Alabama," for more information on fertilization, watering, and mowing practices for St. Augustinegrass lawns.

Selecting St. Augustinegrass cultivars with some resistance to gray leaf spot is recommended for new plantings. The cold-sensitive St. Augustinegrass cultivars Floratam, Delmar, and Jade have good disease resistance. Raleigh is intermediate in reaction to gray leaf spot, while cultivars in the Bitterblue group are extremely sensitive.

Fungicides can protect susceptible St. Augustinegrass cultivars from gray leaf spot. Fungicide applications are most important for intensively managed St. Augustinegrass lawns that have been previously damaged by this disease. Begin fungicide applications as symptoms start to appear, and repeat them every 7 to 14 days when summer weather patterns favor disease development. Although preventative fungicide treatments on St. Augustinegrass sod are usually too costly, periodic fungicide applications during favorable weather conditions may help suppress gray leaf spot damage. Always mow and water turf before applying fungicides. Fungicides recommended for gray leaf spot control on St. Augustinegrass are listed in Table 2 and in the Extension online publication ANR-500-B, *Alabama Pest Management Handbook—Volume 2*.

Table 2. Fungicides for Controlling Leaf Spot and Rust Diseases on Turf

	Application Rate	
	Per 1,000 square feet	
azoxystrobin Heritage 50W	0.2 to 0.4 oz.	Broadcast at first sign of leaf spot/melting out, Gray leaf spot, or rust, and repeat as needed to control disease every 2 to 4 weeks. Refer to label for information concerning resistance prevention practices for strobilurin (QoI) fungicides.
iprodione Chipco Flo	3 to 4 fl. oz.	For use only on sod farms, golf courses, and institutional turf. Apply every 2 to 4 weeks as needed to control leaf spot/melting out or rust. <i>Iprodione will not control rust or Gray leaf spot on St. Augustinegrass.</i>
myclobutanil Eagle 40W Eagle 20EW Immunox Immunox Lawn Disease Control Immunox Lawn Disease Control Granules	0.6 oz. 1.2 fl. oz. 14 fl. oz. 10.8 fl. oz.	Broadcast at first sign of leaf spot/melting out or rust, and repeat applications as needed to control disease every 2 weeks. <i>Will not control Gray leaf spot on St. Augustinegrass.</i> Ready-to-apply applicator. A 32-fluid ounce (1-quart) container will cover 3,000 square feet of lawn. Repeat applications every 2 weeks as needed to control leaf spot/melting out or rust. <i>Will not control Gray leaf spot on St. Augustinegrass.</i> Granular product. Apply with rotary or drop spreader at 2- to 4-week intervals as specified by label for control of <i>rust only</i> . See label for spreader settings.
propiconazole Banner Maxx Liquid Systemic Fungicide Lawn Disease Control	1 to 2 fl. oz. 12 fl. oz. 10 fl. oz.	Broadcast at first sign of disease, and repeat applications as needed to control disease every 2 weeks. For best control of leaf spot/melting out, tank mix Banner Maxx with a recommended broad-spectrum fungicide. <i>Liquid Systemic Fungicide is cleared only for the control of rust.</i> Ready-to-apply applicator. A 32-fluid ounce (1 quart) container will cover 3,200 square feet of lawn. Reapply every 2 to 4 weeks as needed to control leaf spot/melting out or Gray leaf spot. <i>Not labeled for rust control.</i>
pyraclostrobin Insignia	0.5 to 0.9 oz.	For golf course use only. Make first application when conditions favor development of Gray leaf spot, leaf spot/melting out, or rust. Repeat applications at 2- to 4-week intervals as needed to control disease. Refer to label for information concerning resistance prevention practices for strobilurin (QoI) fungicides.
triadimefon Bayleton 50W T/O Systemic Fungicide for Turf and Ornamentals Fungus Control for Home Lawns	0.5 to 1 oz. 28 to 56 fl. oz. 1.5 lb.	Broadcast at first sign of rust, and repeat applications as needed to control rust every 2 to 4 weeks. <i>Will not control leaf spot/melting out or Gray leaf spot.</i> Granular product. Apply with rotary or drop spreader at 2- to 4-week intervals as specified by label for control of rust. See label for spreader settings.
trifloxystrobin Compass 50W	0.1 to 0.25 oz.	Broadcast at first sign of disease and repeat applications every 2 to 3 weeks as needed to control leaf spot/melting out or rust. <i>Not labeled for control of Gray leaf spot.</i> Refer to label for information concerning resistance prevention practices for strobilurin (QoI) fungicides.



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Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency and the Alabama Department of Agriculture and Industries. If a registration is changed or cancelled, the rate listed here is no longer recommended. Before you apply any pesticide, check with your county Extension agent for the latest information.

Trade names are used **only** to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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