

The Plant Doctor: Large (Brown) Patch of Warm-Season Turfgrasses



Figure 1. Late spring symptoms of large patch. Note circular patches (toward the top), and patches that have merged (toward bottom).

Large (Brown) Patch

Most Common Seasons

Spring and fall, when turf is emerging from or entering dormancy.

Weather

Cool nights and warm days with rains or heavy dews.

Turf Types Affected

All warm-season turfgrasses, including St. Augustinegrass, centipedegrass, bermudagrass, and zoysiagrass.

Quick Symptoms

Brown, round patches in the lawn; leaf tips brown or red.

Quick Symptoms and Background

Large patch is the most common lawn disease in Mississippi during the spring and fall. It is characterized by circular patches with brown or smoky-gray outer edges. The circular patches may continue to grow to 20 feet or more in diameter and may intersect with other patches, creating complex patterns (Figure 1). In larger patches, the inside of the patch may begin to turn green again. The patches often occur at the same location year after year, usually in low areas or where dew or moisture persists for longer periods, such as shaded areas.

This disease is caused by a fungus, *Rhizoctonia solani*, which also causes diseases of many agricultural and horticultural crops. The fungus is actually a weak pathogen of warm-season turfgrasses, attacking them during emergence from or entry into winter dormancy, when they are at their weakest. This is why large patch of St. Augustinegrass, centipedegrass, bermudagrass, and zoysiagrass (warm-season turfgrasses) is most common in the spring and fall and is usually not active during the summer, when the warm-

season turfgrasses grow best. This disease has been called many names, including “large patch,” “large brown patch,” “brown patch,” and “*Rhizoctonia* brown patch.”

The *Rhizoctonia solani* fungus also attacks cool-season turfgrasses, such as tall fescue, bentgrass, and ryegrass, but these plants are weakest in our summer heat, so it is a summer disease on them. As you might guess, the disease symptoms are different on cool-season grasses than on warm-season turfgrasses. This publication discusses the disease caused by *Rhizoctonia solani* on warm-season turfgrasses.

Disease Cycle and Symptoms

While the fungus *Rhizotonia solani* is present all year in the soil, certain conditions are needed for the disease to occur. Free moisture in any form, such as extended dew periods, rains, or excessive irrigation, and relatively cool temperatures (60 to 75°F) facilitate the disease, while the cool nights and warm days typical of spring

or fall may prolong it. At temperatures of 75°F and above, and under low-moisture conditions, the activity of the fungus decreases. High nitrogen fertility, especially in response to early fertilizer applications, increases turf susceptibility to the disease. A weak host, such as a warm-season turfgrass emerging from or entering winter dormancy, favors infection.

The first symptom of large patch most people notice is one or more circular, light-green patches that may range in diameter from 2 inches to about 2 feet. These will usually start where patches have grown in previous years, in low areas, or in areas where dew and moisture persist. The patches grow

from the center outward and may spread rapidly or slowly, depending on moisture and temperature conditions. Patches grow as long as conditions are favorable and may spread to 20 feet or more. A green recovery may be seen in the centers of some of the larger patches. In the fall, patch borders are usually brownish to gray. In the spring, as the grass starts to grow, and if the weather remains wet and mild, the patch may turn yellow, gray, and then brown. The color of the outside edge of an actively growing patch is usually a cinnamon-brown (Figure 2).



Figure 2. A St. Augustinegrass lawn with actively growing Large patch. Note the cinnamon-brown color around the outside edges of the patches. This color is characteristic of an actively growing patch.



Figure 3. Diseased St. Augustinegrass plants. The green, cylindrical stolon is just submerged in the soil and runs from right to left. The plants grow off the stolon. The fungus secretes enzymes that digest plant material from the outside in. The outside of the plant tissue starts to decay, and eventually the decay severs the water-conducting tissue inside the plant. The flow of water and nutrients to the leaves of the plant on the left have been severed and the leaves turned brown, but they are still moist from the decay and the weather. The basal (crown) area from which the leaves emerge from the stolon on the right-hand side plant, is decaying (wet brown color of the vertical “stem” portion emerging from the stolon). The lowest leaf has fallen off, leaving a horizontal scar across the crown. The next leaf up (left side of the right-hand plant) has turned entirely brown and the other leaves show some symptoms of water deprivation. The center leaf had turned the characteristic yellow of infected St. Augustinegrass, but the infection has been so active that it is seen as more brown than yellow where it emerges above the area where the other leaves cover it and the top of the leaf is starting to dry.

The fungus begins its attack at the base of leaf sheaths, where the leaves attach to the rope-like stolon (Figure 3). The base of the leaves turns dark brown to almost purple and become soft when conditions are moist and the disease is active. In the absence of moisture, the base will turn tan or reddish-brown and harden. Because the base of the leaf is rotting, the flow of moisture and minerals to the upper leaves is cut off, and the top of the leaf changes color before dying and turning brown.

The upper leaves of St. Augustinegrass will generally turn yellow, whereas the upper part of centipedegrass leaves turns reddish before dying. Centipedegrass and zoysiagrass recover more slowly from large patch than bermudagrass. St. Augustinegrass is in between. In general, the more severe the patch, the longer the recovery. Turf can be so damaged that

you may see the outline of the patch most of the year, even though the pathogen is not active.

One test to confirm the disease is to walk to the edge of the patch, pinch the tip of a symptomatic grass leaf, and gently tug. If the disease is large patch, the leaf should come off in your hand, and the base will be brown to tan. Try this with multiple leaves around the outside of the patch.

If the leaves and stolons come up together, you might have take-all root rot (see MSU Extension Publication 2384 *The Plant Doctor: Take-all Disease of Turfgrasses* at extension.msstate.edu for more information). If the plant and roots come up without stolons, you may have anthracnose. Both of these diseases are typically found during hot weather.

The pathogen can move in flooding heavy rains (Figure 4) or in diseased tissue moved by lawn equipment.

You can have the disease professionally diagnosed and receive a full report and recommendations for a small fee. Collect a 6-by-6-inch sample, including 2 inches of soil and roots, from the edge of the diseased area where it fades into healthy turf. Wrap the sample in dry newspaper, place it in a plastic bag, box it, and send it to our diagnostic laboratory. Please visit <http://extension.msstate.edu/lab> for the current address and fees. Results are usually available within three to seven days after receiving the sample and payment. Refer to MSU Extension Publication M1230 *Plant Diagnostic Laboratory* for more detailed submission instructions.



Figure 4. This lawn was free from large patch for at least 18 years, but it was introduced in 2020. The heavy, early fall rains in 2021 seem to have moved the pathogen to various areas around this drainage ditch, especially downhill.

Prevention is the most effective method of disease control. To prevent large patch or other lawn diseases from developing, follow these disease-control procedures:

- Use grass varieties adapted for your area.
- Properly manage your lawn properly by using recommended practices for watering, mowing, fertilizing, and removing thatch.
- Avoid excessive nitrogen fertilizer (water-soluble nitrogen sources), which promotes a lush turf that is easily attacked by many plant diseases, including large patch.

Due to television advertising campaigns, many fertilize their lawn too early, encouraging large patch disease. Refer to MSU Extension Publication 1322 *Establish and Manage Your Home Lawn* for more guidance on fertility and fertilization. As a general rule, you should not fertilize until you have mowed your warm-season turfgrass lawn at least twice. Early fertilization will feed more weeds than grass and will worsen large patch.

- Avoid watering late in the afternoon or mid-morning, as it allows grass to remain wet for extended periods, encouraging disease development.
- Water infrequently and deeply at times that minimize the leaf wetness period.

Minimize thatch, which is the buildup of grass and plant debris in the root and crown areas of the turf. Excessive thatch creates a favorable environment for the growth of many disease-causing fungi and an unfavorable environment for turf plants. Thatch gives the lawn a spongy texture. If you can wiggle your finger through more than a half-inch of grass before reaching the soil, you probably have excessive thatch. Thatch is most common in zoysiagrass but can occur in most turf types.

Large patch typically occurs in the spring and fall, but has been observed as late as mid-July in overwatered, heavily thatched St. Augustinegrass lawns.

If your lawn has a history of large patch, then you should proactively prevent its development. Applying proper treatments in the fall may reduce the need for spring applications. There are several ways to approach this. For the first option, you need a soil thermometer or access to nearby weather data through the [Delta Agricultural Weather Center](#). The second option does not require these tools, but the use of weather data or a soil thermometer will likely provide the best results.



Figure 5. The area to the left side of this image was treated in about mid-September 2021 when morning soil temperature at the 2-inch depth fell to 70°F, or slightly cooler, for three consecutive days. No symptoms of the disease were visible. The turf to the right side of this image was untreated. This image was taken in late October 2021.

Figure 5 shows experimental turf plots at Mississippi State University in late October. The left area was treated in mid-September after soil temperatures at a 2-inch depth read 70°F, or slightly less, for three consecutive days. The turf on the right side was not treated. The difference is clear.

Professional turf managers use thermometers or weather station information to determine fungicide application timing.

- Use inexpensive soil thermometers or weather station data to watch soil temperatures at a 2-inch depth. The first fungicide application is made after the 2-inch depth soil temperature has been at 70°F or cooler for three consecutive days.

Reliable weather station data can be accessed through the [Delta Agricultural Weather Center](#) website. Not all stations have soil thermometers, but many do.

To use these data:

- Locate your nearest weather station and access their 30-Days Table.

- Scroll to the right to find the temperature readings at a 2-inch depth that occurred during the day.
- Note the maximum and minimum temperature readings for each day. The third and fourth columns indicate the times at which these maximum and minimum temperatures occurred.
- The fifth column, labeled "Soil Temperature Observed at 2-inch Depth," provides an instantaneous reading of the 2-inch soil temperature at 7 a.m. standard time. These values should work as well as the minimum morning soil temperature.

If you live in an urban area, your soil temperatures are likely to be slightly warmer than those recorded by these weather stations.

Using a Thermometer

When using a thermometer, take the 2-inch depth soil temperature around 7 a.m.

If you have neither a soil thermometer nor comparable weather station information, then make an estimate using the following tips.

In the Fall

When the forecaster announces the first cool evenings of fall, apply a fungicide to and around the areas where large patch has occurred before.

Follow label directions until the turf enters dormancy. The label often provides a range of days for the reapplication interval. Applications in both the spring and fall may be spaced further apart during dry weather, and should be more frequent during wet weather and cool temperatures. Proper fall applications may reduce the need for spring treatments.

In the Spring

Watch for rainy periods during warm days followed by cool nights. Pay special attention during the period when the grass is just starting to green.

Apply a fungicide to and around the areas where large patch has occurred before. Follow label directions for repeat applications until you have mowed the lawn twice. The label often provides a range of days for the reapplication interval.

Application Tips

- Applications in both the spring and fall may be spaced further apart during dry weather, and should be more frequent during wet weather and cool temperatures.
- Because the disease is near the soil, apply liquid fungicides in enough water to equal 1 to 2 gallons of water per 1,000 square feet. This will carry the fungicide into the area of the plant that can best absorb it and best fight the disease. Apply granular formulations when no moisture is on the leaves. Follow label directions.

Recommended Fungicides

Three active ingredients for residential use are readily available in garden stores and co-ops. Two of the active ingredients are members of the same class of chemistry. A 2010 trial showed that one of these, myclobutanil (both granular and liquid formulations) burned turf in temperatures higher than 80°F. The other, propiconazole, was not in the trials, but it has been reported to cause similar burns when it is used on warm-season turf at similar temperatures. These products are:

Myclobutanil

Sold as

- Fertilome F Stop (0.39% granular, 10-pound bag)
- Fung-Away Systemic Lawn Fungicide (granular, 10-pound bag)
- Fertilome F-Stop (0.39%, 10- and 20-pound bag)
- Fertilome F-Stop Lawn and Garden Fungicide (1.0% liquid and ready-to-use hose bottle)
- Monterey Fungi-Max Brand (liquid)
- Spectracide Immunox Multi-Purpose Fungicide Spray Concentrate (1.56% liquid).

Propiconazole

Sold as

- Bioadvanced Fungus Control for Lawns (0.51% granular or a 2.42% ready-to-spray)
- Bonide Infuse Systemic Disease Control (1.5% liquid or ready-to-spray)
- Fertilome Liquid Systemic (1.55% liquid).

Azoxystrobin

Sold as

- Scotts Disease EX Fungicide (10-pound bag)
- Heritage G (30-pound bag)

Usage

- Preventive: Apply 2 pounds per 1,000 square feet.
- Curative: Apply 4 pounds per 1,000 square feet.

Note: While Heritage G is not a restricted-use fungicide, it is primarily used by professionals and may not be readily available in garden stores. It must often be ordered. Azoxystrobin does not cause turf burn or phytotoxicity.

The information given here is for educational purposes only. References to commercial products, trade names, or suppliers are made with the understanding that no endorsement is implied and that no discrimination against other products or suppliers is intended. Products, especially for residential use, change frequently. This information was accurate at the time of publication.

Publication 3743 (POD-03-25)

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Produced by Agricultural Communications.

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Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. ANGUS L. CATCHOT JR., Director

