

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, 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 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 stays 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 entering 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 *Rhizoctonia solani* is present all year in the soil, certain conditions are needed for disease to occur. Extended dew periods, rains, or excessive irrigation must be present because the disease is often worse in low, wet areas. 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 and 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 presence is increased. 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 out 20 feet or more. A green recovery may be seen in the centers of some of the greater large 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).

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 is 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, and the top of the leaf turns color before dying and turning brown.

The upper leaves of St. Augustinegrass will generally turn yellow, whereas the upper part of centipedegrass leaves turn 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 be able to see the outline of the patch most of the year, even though the pathogen is not active.



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 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.



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.

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. The leaf should come off in your hand and the base will be brown to tan, if the disease is large patch. 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 Extension publication **P2384 The Plant Doctor: Take-all Disease of Turfgrasses** for more information). If the plant and roots come up without no 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 perhaps in diseased tissue moved by lawn equipment.

You can have the disease professionally diagnosed and receive a full report and recommendation for a small fee. Collect a 6-by-6-inch sample, including 2 inches of soil and roots, from the edge of the disease area where it fades into healthy turf. Wrap the sample in dry newspaper, place it in a plastic bag, box it, and send the box to our diagnostic laboratory. Please see <http://extension.msstate.edu/lab> for the current address and fees. Results are usually available within 3 to 7 days of receiving the sample and payment. Read **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 down-hill.

Prevention is the best method of disease control. To prevent large patch or other lawn diseases from developing, practice the following disease-control procedures:

- Use varieties adapted for your area.
- Manage your lawn properly by using recommended practices for watering, mowing, fertilizing, and removing thatch.
- Too much nitrogen fertilizer (water-soluble nitrogen sources) promotes a lush turf that is readily attacked by many plant diseases, including large patch. Because of television advertising campaigns, many fertilize their lawn too early and are encouraging the large patch disease. See **P1322 Establish and Manage Your Home Lawn** for more guidance on fertility and fertilization, but a general rule of thumb is that you should not fertilize until you have mowed your warm-season turfgrass lawn at least twice. Earlier fertilization will feed more weeds than grass, and also make large patch worse.
- Watering late in the afternoon or mid-morning lets the grass remain wet for long periods of time, encouraging disease development. Water infrequently and deeply at times that do not extend the leaf wetness period.
- Thatch is the buildup of grass and plant debris in the root and crown areas of the turf. Too much thatch creates a favorable environment for the growth of many disease-causing fungi and, at the same time, an unfavorable environment for turf plants. Thatch gives the lawn a spongy feeling. If you can wiggle your finger through more than a half-inch of grass before contacting the soil, you probably have too much thatch. Thatch is most common in Zoysiagrass but can occur in most turf-types. Large patch is typically a disease that 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 be proactive in preventing its development. Proper fall treatments 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 <http://deltaweather.extension.msstate.edu/stations>. 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 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 on the Extension website. Not all stations have soil thermometers, but many do.
- Find your nearest weather station and locate their 30-Days Table. Scroll to the right to find the temperature readings at the 2-inch depth that occurred during the day. There is a maximum temperature and a minimum temperature reading for each day. The third and fourth columns are the time at which the maximum and minimum temperatures occurred. These are followed by a fifth column, "Soil Temperature Observed at 2-inch depth." This is an instantaneous reading of 2-inch soil temperature at 7 a.m. standard time. The temperatures from this column should work as well as the minimum morning soil temperature.



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.

- ◆ If you live in an urban area, your soil temperatures are likely to be slightly warmer than those recorded by these weather stations.
- 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.
 - ◆ 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 3 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. Granular formulation should be applied when no moisture is on the leaves. Follow label directions.

- There are four active ingredients for residential use 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:

1. Myclobutanil. Sold as Fertilome F Stop (0.39% granular, 8
2. Propiconazole. Sold as Bioadvanced Fungus Control for Lawns (0.51% granular or a 2.42% ready-to-spray), Bonide Infuse Systemic Disease Control (1.8% liquid or ready-to-spray), and Fertilome Liquid Systemic (1.55% liquid).
3. Thiophanate-methyl. Sold by Bonide as Infuse Lawn & Landscape Granules. This fungicide, as well as the fourth one, azoxystrobin, should not cause any "burn" or turf phytotoxicity. For pollinator safety, use it on lawns with no or only a few flowering weeds.
4. The fourth active ingredient is a granular formulation of azoxystrobin. This is sold in a 10-pound bag as Scotts Disease EX Fungicide or in a 30-pound bag as Heritage G. Both are labeled at 2 pounds of product per 1,000 square feet for preventive usage and 4 pounds for curative usage. Heritage G can be purchased and used by residential owners (it is not a restricted-use fungicide, nor is it only for professional use), but it is used by professionals. Because this product is mostly used by professionals, it is not generally carried by garden stores and must be ordered.



MISSISSIPPI STATE UNIVERSITY™
EXTENSION

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-02-22)

By **Alan Henn**, PhD, Extension Professor, Biochemistry, Molecular Biology, Entomology and Plant Pathology.

Copyright 2022 by Mississippi State University. All rights reserved. This publication may be copied and distributed without alteration for nonprofit educational purposes provided that credit is given to the Mississippi State University Extension Service.

Produced by Agricultural Communications.

Mississippi State University is an equal opportunity institution. Discrimination in university employment, programs, or activities based on race, color, ethnicity, sex, pregnancy, religion, national origin, disability, age, sexual orientation, gender identity, genetic information, status as a U.S. veteran, or any other status protected by applicable law is prohibited.

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. GARY B. JACKSON, Director