

Identification and Control of **Rhizoctonia** **Large Patch** *in Georgia*

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Introduction

Rhizoctonia large patch is the most common and severe disease of warm season grasses (bermudagrass, centipedegrass, seashore paspalum, St. Augustinegrass, and zoysiagrass) across the state of Georgia. Due to spring and fall disease-promoting environmental conditions across Georgia coinciding with grasses leaving and/or entering dormancy, large patch can appear in warm season grasses in various grass-growing settings, including home lawns, landscapes, sports fields, golf courses, and sod farms.

The Pathogen

Large patch is caused by the soilborne fungus *Rhizoctonia solani* AG 2-2 LP. It is noteworthy to mention that a different strain of the same fungus (*R. solani* AG 1-A) causes brown patch on cool season grasses.

Symptoms

The disease is most apparent during the spring and fall, when warm season turfgrasses are entering or exiting their period of winter dormancy. Circular patches of affected turf are easily observed, ranging in diameter from 3 feet to 26 feet (Figure 1). Leaves of recently infected turf, located at the periphery of the patch, may appear bright yellow and/or orange in color (Figure 2). Patches may be perennial, recurring in the same location and expanding in diameter year after year. *R. solani* infection of warm season grasses occurs on the leaf sheaths (Figure 3), where water-soaked, reddish-brown, or black lesions are observed. As a direct result of these leaf sheath infections, foliar dieback spreads from the leaf tip toward the base. The centers of the patches develop thin and sunken areas that may be invaded by weeds. Extensive patches diminish turf quality by disturbing the aesthetic value and reducing the playability of turf surfaces.

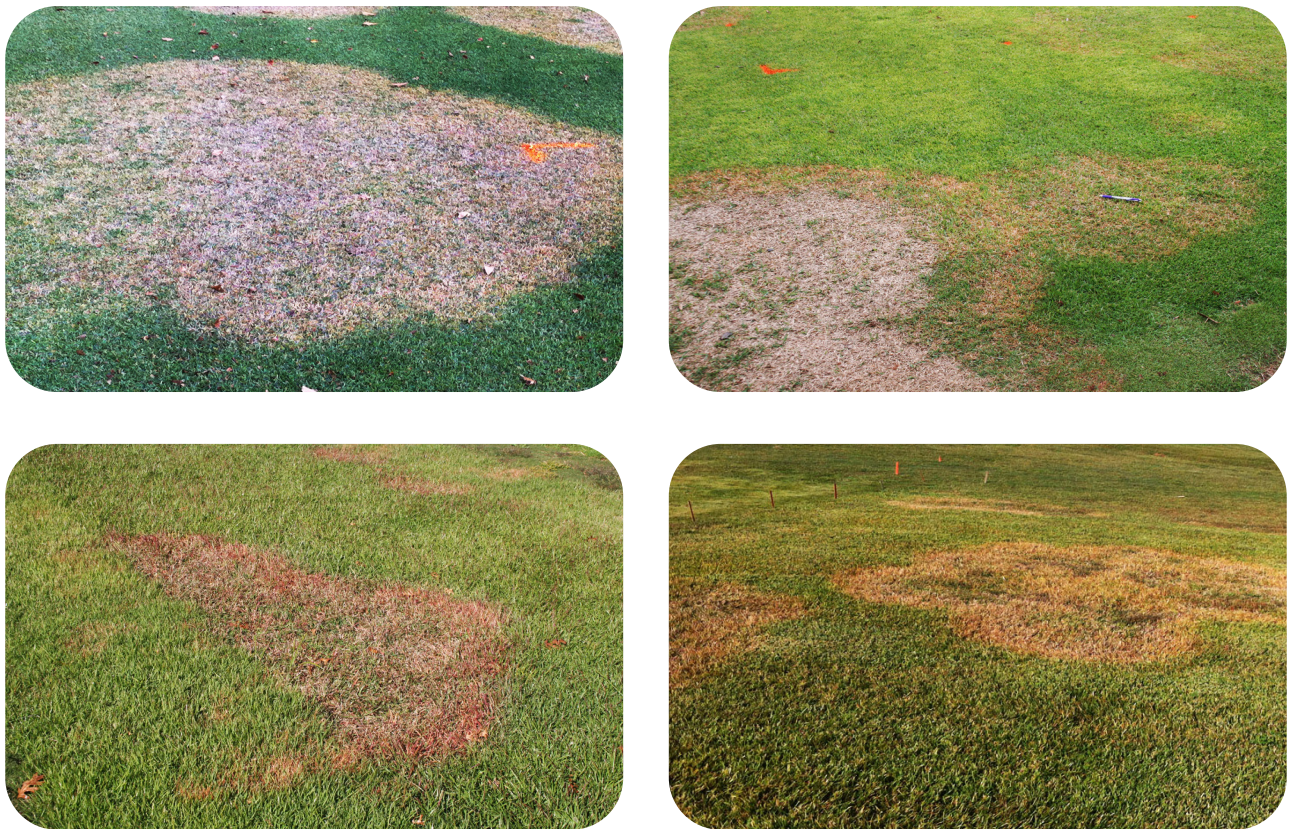


Figure 1. Large patch symptoms on warm season grasses.
Clockwise: zoysiagrass, zoysiagrass, centipedegrass/zoysiagrass, St. Augustinegrass (Photos by A. Martinez).



Figure 2. Large patch symptoms on the periphery of the patch.
Note the reddish color on recently infected plants (Photos by A. Martinez).



Figure 3. *R. solani* infecting leaf sheets of warm season grasses.
St. Augustinegrass on left; zoysiagrass on right (Photos by A. Martinez).

Conditions Favoring Rhizoctonia Large Patch

R. solani large patch is a strong saprophyte, meaning it is able to survive for extended periods of time in the absence of living host plants by feeding on decaying organic matter. When conditions are not favorable for growth, the fungus persists in the thatch layer and soil. When a host plant is present and environmental conditions are favorable, the fungus begins to colonize the surface of the potential host plant (Figure 4).

Infection of the lower leaf sheaths by *R. solani* occurs whenever the temperature of the thatch layer is between 50 and 70 °F, and continuous moisture is available for at least 48 hr.

Because warm season grasses are not growing vigorously during the spring and fall, they are highly susceptible to pathogen attack. Patches may also develop in the summer during periods of cool weather, especially in wet or shaded sites (Figure 5). Excessive moisture levels in the soil, thatch, and lower turf canopy encourage the development of large patch. Poor drainage, shade, restricted air movement, or excessive irrigation increase the severity of this disease.

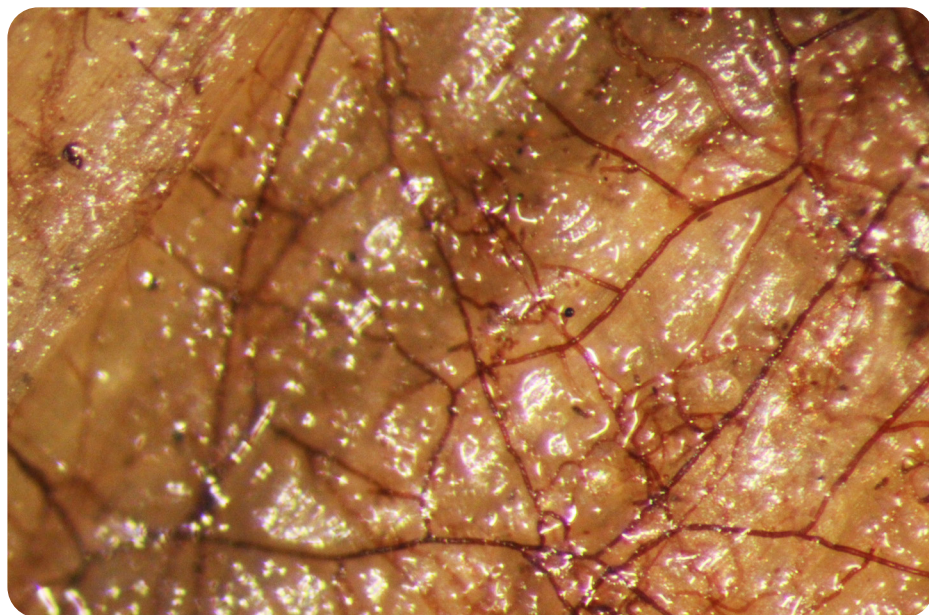


Figure 4. Hyphae of *Rhizoctonia* on crowns and sheaths of grass (Photo by A. Jogi).

Management



Figure 5. Large patch symptoms are more prevalent in wet and shaded areas (Photos by A. Martinez).

Large patch is an endemic and severe disease of warm season grasses in Georgia. A multi-pronged approach to management is most effective.

Genetic Control

Establishment of a turfgrass species best adapted to your geographical area and more specifically to your location, situation, or landscape is one the most effective means for management of large patch. In Georgia, all warm season grasses are susceptible to large patch. In the Piedmont region, zoysiagrass and centipedegrass are most commonly affected. In the Coastal Plain of Georgia, St. Augustinegrass and centipedegrass usually show more dramatic symptoms. Throughout the state, bermudagrass will develop large patch at similar levels as other warm season grasses. However, bermudagrass may recover from large patch damage more rapidly because of its aggressive growth habit. UGA Extension can provide you the most updated information concerning turfgrass species and cultivar selection for your area and particular situation. The national turfgrass evaluation program is an excellent resource for information on turfgrass species and turfgrass cultivars (<http://www.ntep.org>).

Cultural Control

Excessive moisture levels in the soil, thatch, and lower turf canopy are the most important environmental factors in causing large patch epidemics. Regulation of moisture levels in the thatch and soil is an essential aspect of large patch management. Large patch is most severe in areas that have little air movement and/or excessive shade. To limit large patch severity and improve overall turf quality in areas that are poorly drained, install drainage tile, modify the soil profile to increase porosity, and/or cultivate soil to reduce compaction and thatch accumulation. Control traffic patterns to prevent severe compaction, and core aerate to improve soil drainage and increase air circulation around the shoots and roots. Where air movement and sunlight penetration are low, prune or remove surrounding trees and shrubs. No more than once a week, turf should be irrigated deeply, but only as necessary to meet its water requirements.

Warm season grasses vary in their fertility requirements (Table 1). To manage large patch, a sound fertility program should adhere to the recommended guidelines for your particular turf species and should be based on an updated soil test. High and untimely nitrogen applications have been associated with increased susceptibility to large patch. Do not apply nitrogen-containing fertilizers before soil temperatures at the 4-in. depth are consistently 65 °F and rising. For local soil temperature for your area, visit the Georgia Weather Network website: <http://www.georgiaweather.net/index.php?content=tr&variable=XS>. In the Georgia Piedmont area, these temperatures usually occur in early May. For complete and up-to-date information on fertility for warm season grasses, consult your county agent, visit <https://turf.caes.uga.edu>, and/or refer to the annual UGA Turfgrass Pest Control Recommendations for Professionals.

Mowing height has influence on the development of large patch. In general, large patch symptoms appear to be more severe at low mowing heights. On zoysiagrass, large patch severity increases as mowing height is decreased from 1.5 to 0.5 in. Reduced mowing heights result in a more dense turf stand, which may create a more favorable environment for large patch development by reducing air movement and increasing humidity in the lower turf canopy. It is important to keep the mowing height consistent and correct for the specific variety of turf in your landscape.

Chemical Control

Homeowners: Few effective fungicides are available for the general public to use for large patch management, so emphasis should be placed in cultural and genetic control. For a complete list of homeowner fungicides for large patch, see the Home and Garden Edition of the Georgia Pest Management Handbook: <https://extension.uga.edu/publications/detail.cfm?number=SB48>.

Professionals: A variety of fungicides are available to commercially licensed turfgrass managers for large patch control. Fungicides in the following classes are labeled for large patch control: carboxamides, benzimidazoles, carbamates, dicarboximides, DMI fungicides, di-nitro anilines, nitriles, polyoxins, and Q₀ inhibitors. Several biological fungicides are now labeled for large patch control. For a complete and updated list of fungicides available for commercial control of large patch, see the Georgia Pest Management Handbook — Commercial Edition: <https://extension.uga.edu/publications/detail.cfm?number=SB28>. In turf stands with a history of large patch epidemics, preventative fungicide applications provide excellent control when applied at the proper time. The first fungicide application should be made in the fall when conditions become conducive for large patch development, specifically when the thatch temperature drops below 69.8 °F for several consecutive days. Subsequent applications should be made as specified on the fungicide label. Because the majority of disease development occurs in the fall, fungicide applications at this time are most important. However, when disease pressure is severe, spring applications may also be required to achieve adequate control.

Summary

Rhizoctonia large patch is the most common and severe disease of warm season grasses across the state of Georgia. The disease is apparent during the spring and fall, when warm season turfgrasses are entering or exiting their period of winter dormancy. Circular patches of affected turf are easily observed. Infection of the lower leaf sheaths by *R. solani* occurs whenever the temperature of the thatch layer is between 50 and 70 °F, and continuous moisture is available for at least 48 hr.

Management strategies include:

- Establishing a turfgrass species best adapted to your geographical area and situation;
- Making sure that areas are well-draining, as moisture levels in the thatch and soil is an essential aspect of large patch management;
- Preventing and/or alleviating soil compaction;
- Implementing a sound fertility program according to recommended guidelines for your particular turf species and an updated soil test;
- Cutting grass at the proper mowing height for that species;
- Emphasizing cultural and genetic control on home lawns, as few effective fungicides are available for the public to use for large patch management; and
- Applying fungicides in the following classes for commercial turf: carboxamides, benzimidazoles, carbamates, dicarboximides, DMI fungicides, di-nitro anilines, nitriles, polyoxins, and Q₀ inhibitors.

Table 1. Georgia Turfgrass Fertility Recommendations.

Turfgrass Species	Recommended Amounts of Nitrogen (per 1,000 square feet per year)	Fertility ¹ Calendar	Mowing Height ²
Bermudagrass (<i>Cynodon dactylon</i>)	2-5 pounds	Best months: May, June, July, August Possible: April, September	Common Bermuda: 1-2 inches (2.5-5.8 centimeters) Hybrid Bermuda: 1-1.5 inches (2.5-3.8 centimeters)
Centipedegrass (<i>Eremochloa ophiuroides</i>)	1-2 pounds	Best months: May, July Possible: June, August	1-2 inches (2.5-5.8 centimeters)
St. Augustinegrass (<i>Stenotaphrum secundatum</i>)	2-5 pounds	Best months: May, June, July, August Possible: September	2-3 inches (5.8-7.6 centimeters)
Seashore paspalum (<i>Paspalum vaginatum</i>)	2-4 pounds	Best months: May, June, July, August Possible: April, September	0.5-0.75 inches to 1-1.5 inches (1.2-1.9 centimeters to 2.5-3.8 centimeters)
Zoysiagrass (<i>Zoysia</i> spp.)	2-3 pounds	Best months: May, June, July, August Possible: April, September	1-2 inches (2.5-5.8 centimeters)

¹ Follow fertilizer recommendations on soil test report. If the soil was not tested, use any turf fertilizer and follow label rates. In the spring, do not apply nitrogen-containing fertilizers until the soil temperature at the 4-inch depth is constantly 65 degrees Fahrenheit and rising.

² Remove no more than one-third of the total height at one time, and raise cutting height by 0.5 inches in hot weather. Table modified from Waltz et al., 2016: http://www.commodities.caes.uga.edu/turfgrass/georgiaturf/Publicat/1640_Recommendations.htm

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