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Large Patch vs. Brown Patch in Turfgrass: How to Tell the Difference

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Overview

Large patch and **brown patch** are common names referring to turfgrass diseases caused by genetically different strains of the fungus *Rhizoctonia solani*. The diseases caused by this fungal pathogen are among the most common turfgrass diseases in Tennessee. Historically, large patch and brown patch were considered a single disease, and the terms were sometimes used interchangeably in older Extension and educational materials. However, subsequent research has shown that they are caused by genetically distinct groups of *Rhizoctonia solani* with unique hosts, symptomology and seasonal activity. Although many fungicides and cultural practices used to manage these diseases may seem similar, it's important to tell them apart when developing management plans. This helps ensure that application rates, timing and reapplication intervals are used correctly for both preventive treatments and cultural approaches. Understanding how symptoms differ can also be important, particularly when trying to spot early signs of the disease. In this publication, we explain the key differences between large patch and brown patch.

History and Biology

Rhizoctonia infections in turfgrass were first documented in the United States more than 80 years ago. Several species of this fungus infect most of common turfgrass species including tall fescue (*Festuca arundinacea*), creeping bentgrass (*Agrostis stolonifera*), zoysiagrass (*Zoysia japonica* and *Z. matrella*), bermudagrass (*Cynodon dactylon*) and St. Augustinegrass (*Stenotaphrum secundatum*). *Rhizoctonia* species can survive for long periods even without a living host plant. They do this in two ways: by feeding on decaying organic matter and by forming tough resting structures called **sclerotia**, which persist in the thatch and soil. When conditions are favorable, the fungus grows as long, unbranched filaments called runner hyphae. These filaments can cluster together to form specialized structures known as infection cushions. Using these cushions, the fungus produces enzymes and toxins that allow it to penetrate and infect plants. Once established, the fungus spreads from infected plants to nearby healthy ones by its hyphae.

Rhizoctonia solani is divided into groups based on the ability of hyphae, the threadlike filaments that make up the body of a fungus, to fuse with one another. These groups are called **anastomosis groups (AGs)**. There are several AGs of *R. solani*, many of which do not infect turfgrasses but instead affect other crops, such as lettuce and beans (AG 1-IB) and cotton and tomato (AG 7). Isolates within the same AG are closely related and tend to have similar hosts. Isolates in AGs 1 and 2 are most commonly associated with turfgrass diseases. There is also AG 6, which is a weaker pathogen of turfgrass.

Quick Tips

Large Patch = Warm-season turfgrass, fall/spring timing

Brown Patch = Cool-season turfgrass, summer timing

Correct timing of fungicides application is critical for both diseases.

Large Patch vs. Brown Patch: A Closer Look

In cool-season turfgrasses such as tall fescue and Kentucky bluegrass, brown patch is generally associated with *Rhizoctonia solani* AG 1-IA and AG 2-2 IIIB. However, this disease is exceedingly rare on Kentucky bluegrass (Personal conversion, Brandon Horvath, Department of Plant Sciences, University of Tennessee). Whereas, in warm-season turfgrasses, *R. solani* AG 2-2 LP (where "LP" denotes large patch) is associated with large patch disease.

Key Differences

Feature	Large Patch	Brown Patch
Primary Host	Warm-season grasses: Zoysiagrass (*Zoysia spp.*), Bermudagrass (*Cynodon spp.*), St. Augustinegrass (*Stenotaphrum secundatum*), Centipedegrass (*Eremochloa ophiuroides*)	Cool-season grasses: Tall fescue (*Festuca arundinacea*)
Season	Fall through spring (cool, wet weather)	Summer (warm, humid nights)
Patch Symptoms	Large, circular patches (ranging from 1 ft to greater than 3 ft in diameter) with orange/yellow margins	Irregular, but roughly circular patches a (6 inches to several feet in diameter) with a gray "smoke ring" in early morning
Leaf Symptoms	When inspected closely, affected leaves may pull easily from the crown and show reddish-brown sheath rot	Leaf lesions are light brown with dark borders and are round to irregular in shape
Spread Pattern	Reoccurs yearly in same locations, expands slowly	Can spread quickly under favorable conditions
Favorable Condition	Fall and spring soil temperatures between 50 F and 70 F, prolonged moisture, poor air movement and soil drainage	Summer soil temperature above 60 F (severity is greatest when low and high temperatures are above 70 F and 90 F, respectively), high relative humidity above 95%, prolonged leaf wetness for at least 10 to 12 hours, excessive nitrogen, poor drainage and air movement
Best Management Timing	Fall (before dormancy)	Summer (during peak humidity)

Management Strategies

Methods	Large Patch	Brown Patch
Cultural Control	• Avoid applying excess nitrogen application in late fall and early spring, before grass is actively growing • Improve drainage and reduce excessive thatch • Avoid scalping • Water early in the morning, avoid evening irrigation	• Avoid high nitrogen during hot, humid summer periods (Don't apply more than 0.5lb nitrogen/1,000 sq ft when conditions favor disease development) • Improve air movement and reduce leaf wetness • Irrigate deeply but infrequently and avoid evening irrigation
Chemical Control (See Table 1)	• Preventative fungicide applications in fall (before dormancy) provides the best control. Monitor for soil temperatures that have consistently dropped to around 70F. • Sequential applications may be made as long as environmental conditions remain conducive to disease activity. Always read and follow label directions for specific rate and reapplication interval guidance.	• Preventive fungicides applications in late spring and early summer when average soil temperatures rise consistently above 68 -70F can be effective. • Sequential applications may be made as long as environmental conditions remain conducive to disease activity. Always read and follow label directions for specific rate and reapplication interval guidance.

Table 1. List of some fungicide products and active ingredients labeled for brown patch and large patch

Commercial or Professional Grade Products†		
Product	**Active ingredient(s)**	**FRAC code***
Heritage®	azoxystrobin	11
Headway®	azoxystrobin + propiconazole	11 + 3
Compendium®	azoxystrobin + propiconazole	11 + 3
Strobe®	azoxystrobin + tebuconazole	11 + 3
Union®	cyazofamid + azoxystrobin	21 + 11
Ascernity®	benzovindiflupyr + difenoconazole	7 + 3
Prostar®	flutolanil	7
Pedigree®		
Fame®	fluoxastrobin	11
Xzemplar®	fluxapyroxad	7
Tourney®	metconazole	3
Eagle®	myclobutanil	3
Insignia®	penthiopyrad	7
Lexicon Intrinsic®	pyraclostrobin + fluxapyroxad	11 + 7
Pillar G®	pyraclostrobin + triticonazole	11 + 3
Bayleton®	triadimefon	3
Trinity®	triticonazole	3
Daconil	chlorothalonil	M5
Orthro® MAX®		
Home Lawn or Consumer Grade Products†		
Product	**Active ingredient(s)**	**FRAC code***
Bonide Infuse BioAdvanced Fungus Control	propiconazole	3
Scotts DiseaseEx Heritage G	azoxystrobin	11
Cleary's 3336	thiophanate-methyl	1

†Always read and follow label directions when using any pesticide product. Commercial or professional-grade formulations are intended for licensed or trained applicators familiar with proper sprayer or spreader calibration, mixing and application techniques.

*FRAC Code–Fungicides with the same FRAC Code have the same mode of action. See **frac.info** for an explanation of the FRAC Codes. Rotation of fungicides with different FRAC Codes could minimize the development of fungicide resistant strains.

Figure 1: *Zoysiagrass infected with large patch disease*
(Image credit: Alan Windham, Emeritus Professor, University of Tennessee)

Figure 2: *Large patch on bermudagrass*
(Image credit: Alan Windham, Emeritus Professor, University of Tennessee)

Figure 3: *Large patch on St. Augustinegrass*
(Image credit: Alan Windham, Emeritus Professor, University of Tennessee)

Figure 4: *Reddish brown sheath rot on bermudagrass infected with large patch (Image credit: Alan Windham, Emeritus Professor, University of Tennessee)*

Figure 5: *Brown patch on tall fescue (Image credit: Alan Windham, Emeritus Professor, University of Tennessee)*

Figure 6: *Brown patch on tall fescue showing a smoky ring (Image credit: Alan Windham, Emeritus Professor, University of Tennessee)*

Figure 7: *Irregular, light brown leaf lesions with dark borders on tall fescue (Image credit: Michell Mote, Rutherford County Extension, Murfreesboro, Tennessee)*

Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label.

Disclaimer

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication. Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The authors, the University of Tennessee Institute of Agriculture and University of Tennessee Extension assume no liability resulting from the use of these recommendations.

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