

TAKE-ALL ROOT ROT

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Take-all root rot is a fungal disease that causes weak, brown, dead patches in turfgrass. In Texas, the disease severely affects St. Augustinegrass (Fig. 1) and bermudagrass (Fig. 2), in which the disease is known as bermudagrass decline.

Take-all root rot is caused by a fungus, *Gaeumannomyces graminis* var. *graminis*, that lives in the soil. The fungus lives in many parts of Texas and is commonly found in both diseased-looking and apparently healthy-looking turfgrass. It lives in thatch, which is a layer of plant roots, stolons (shoots that grow horizontally along the ground surface), and decaying plant matter.

The fungus can produce spores but spreads mainly through the roots and stolons. The disease is not usually transported by mowers or foot traffic; it is more likely to be spread when infected grass, thatch, or soil is moved elsewhere.

The symptoms of take-all root rot often appear in spring or early summer when the turfgrass emerges from winter dormancy. However, they may appear anytime during the growing season when the grass is stressed by heat, drought, shade, alkaline soil, or high-sodium water.

The most obvious initial symptom is yellowish foliage that eventually turns brown and wilts. The turf thins out, leaving brown, irregular patches from 1 foot to more than 20 feet in diameter.

As a field diagnosis, look at the roots of infected grass, which are usually short, blackened, and rotten, making it easy to lift the stolons from the soil (Fig. 3). The nodes, or stem joints, may be discolored.

LOOK-ALIKE TURF PROBLEMS

On St. Augustinegrass, take-all root rot may be easily mistaken for large patch, which is caused by *Rhizoctonia solani* (Fig. 4), or chinch bug injury (Fig. 5). If you suspect



Figure 1. Large, irregular patches of take-all root rot on St. Augustinegrass.



Figure 2. Bermudagrass infected with take-all root rot.

that your grass has take-all root rot, first eliminate the possibility of these other two common problems. The treatments for them differ greatly from those for take-all root rot.

Chinch bugs: Chinch bugs are about the size of a sesame seed and move fast, which makes it difficult for the untrained eye to recognize them. To confirm the presence of chinch bugs on your turfgrass:

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Figure 3. Dead roots and stolons of St. Augustinegrass.

1. Mix 1 to 2 tablespoons of liquid dishwashing detergent in 1 gallon of water.
2. Use a watering can to pour the mixture evenly over a 1-square-yard area of the affected turf.
3. Look closely for chinch bugs.

Within minutes, they will begin scurrying about. The adult bugs are black and about 3/16 inch long, with distinctive shiny, white wings; the immature nymphs are smaller and reddish, with a whitish band across the back (Fig. 6). If many chinch bugs appear, they are probably the main cause of the turf problem.

In some cases, the turfgrass may be afflicted by both chinch bugs and take-all root rot. If so, you must act against both culprits, and you may need to apply both an insecticide and a fungicide.

Large patch: An easy diagnosis method is to pull a few plant leaves out. Unlike those infected with take-all root rot, grass blades with large patch can be slipped easily from the stolon because the fungus has rotted the stems. Infected leaves often have a slimy, dark brown lesion at the base of the leaf (Fig. 7).

Another difference is that large patch first appears in the fall and continues until early spring. The infected turf recovers quickly as temperatures rise in the spring.

For information on preventing, identifying, and controlling large patch and other common turfgrass diseases, see *Warm-Season Turfgrass Disease Management in Urban Landscapes*. Chinch bug control is described in *Chinch Bugs in St. Augustine Lawns*. Both are available for free download from AgriLife Learn at AgriLifeExtension.tamu.edu.



Figure 4. Normally circular large patch damage.
Photo by Benjamin Wherley.



Figure 5. Chinch bug damage on a St. Augustinegrass lawn.



Figure 6. Chinch bug adults (the three insects on the left with fully developed wings) and nymphs in different stages of growth.
Photo by Bart Drees



Figure 7. St. Augustinegrass stems showing the dark lesions caused by large patch.

PREVENTION

To prevent take-all root rot, the most effective approach is to take proper care of the grass. The disease usually becomes a serious problem when the turfgrass is under stress because of unfavorable environmental conditions and improper management—excessive shade, herbicide injury, soil compaction, temperature extremes, imbalanced soil fertility, inappropriate irrigation scheduling, improper mowing height or frequency, or any other condition that weakens the turf.

Encourage healthy root development as much as possible. Make sure that the area drains well at and below the soil surface. Turf areas that remain wet are prone to the disease. Improve the drainage, and avoid overwatering. It is better to water infrequently but deeply (6 to 8 inches deep) than to give the grass frequent, shallow watering.

Have the soil tested, then fertilize on the basis of the test results.

If excessive thatch has built up (more than inch thick), the lawn becomes spongy and tends to scalp when mowing. The thatch can be reduced by using a vertical mower, aerating the soil with a core aerifier, and mowing at the proper height (2 to 3 inches for St. Augustinegrass; 1 to 2 inches for bermudagrass).

Applying too much nitrogen encourages thatch to accumulate, making the turfgrass more vulnerable to disease outbreak and other environmental stress.

CONTROL AND MANAGEMENT

To reduce take-all root rot, lower the soil pH to a range of about neutral to slightly acidic levels, if practical. Some soils can be slowly acidified over years by

continual applications of ammonium sulfate, powdered sulfur (3 to 5 pounds per 1,000 square feet per year) mixed with well-decomposed compost, or sphagnum peat moss (1 to 2 bales per 1,000 square feet per application; each bale is 3.8 cubic feet; make 1 to 2 applications per year).

Be judicious and apply ammonium sulfate— or any other quick-release soluble nitrogen—at a rate no higher than 1 pound of nitrogen per 1,000 square feet per application. For St. Augustinegrass, apply no more than 4 pounds of nitrogen fertilizer per 1,000 square feet per year; for bermudagrass, apply no more than 5 pounds per 1,000 square feet per year.

Once take-all root rot has infested a lawn, you will probably need to apply fungicide (Table 1) as well as adopt proper cultural practices, such as mowing and watering. The best times to apply fungicides are in spring and fall.

Mix the fungicide with plenty of water (4 to 5 gallons of water per 1,000 square feet) and thoroughly water the grass immediately after application ($\frac{1}{4}$ to $\frac{1}{2}$ inch water). The water will ensure that the product moves into the

Table 1. Fungicides that help control take-all root rot in lawns.

Common name	Trade names for homeowner use
azoxystrobin	Maxide Disease Killer, Heritage G
myclobutanil	SpectracideImmunox Lawn Disease Control SpectracideImmunox Lawn Disease Control Granules, Fertilome F-Stop Green Light Fung-Away Systemic Lawn Fungicide
propiconazole	Fertilome Liquid Systemic Fungicide Monterey Fungi-Fighter, Bonide Fung-onil Lawn and Garden Disease Control Bonide Infuse Concentrate Systemic Disease Control Ortho Lawn Disease Control, Bonide Infuse concentrate, Bonide Infuse RTS Bayer Fungus Control for Lawns Ready to Spray Bayer Fungus Control for Lawns Ready to Spread Granules
thiophanate-methyl	Fungo 50, Fungo Flo, Scott's Lawn Fungus Control Southern Ag Thiomyl Bonide Lawn and Landscape Granules Lawn and Landscape Systemic Disease Control Bonide Infuse Lawn & Landscape Granules

grass stolon and root zone rather than drying on the leaves. To help the fungicide reach the soil, rake and remove any infected or dead plant materials before application.

Fungicides are best used as preventive measures before symptoms develop. The level of control will be inconsistent if the treatment is given after the turf has already shown symptoms.

Always read and carefully follow the instructions and precautions on the product label. Except for the azoxystrobin and thiophanate-methyl products, do not apply the fungicides in Table 1 at high rates during hot weather. Such applications can stress bermudagrass and St. Augustinegrass.

Research at Rutgers University has indicated that the severity of take-all root rot can be reduced by applying manganese fertilizer. However, the proper rate and time of application have not been evaluated or established in Texas.

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