

Take-all Root Rot of Turfgrass

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Take-all root rot is a serious disease caused by the soil-borne fungus *Gaeumannomyces graminis* var. *graminis*. Take-all root rot causes brown, dead areas to develop in turfgrass. The disease was first described in Texas in 1991 on St. Augustinegrass. Since then, it has been confirmed on bermudagrass (where it is often called bermudagrass decline), zoysiagrass and centipede grass.

Symptoms and diagnosis

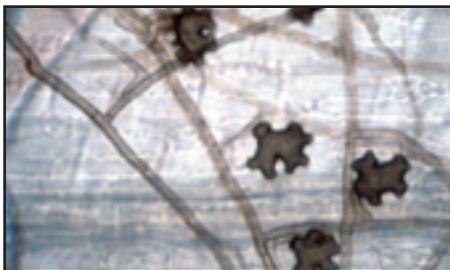
Symptoms of take-all root rot often are noticed first in spring or early summer, but may show up at any time during the growing season. The grass appears yellowish (chlorotic) and thins out in large, irregular patches 1 foot to more than 20 feet in diameter. Individual grass blades do not separate easily from stolons (horizontal stems). The roots of infected grass are usually short, blackened and rotted. The stolons often can be lifted easily from the soil because of the poor root system. Nodes may be discolored. The yellowish foliage eventually dies and turns brown.

Take-all root rot may be mistaken for *Rhizoctonia* brown patch or chinch bug injury on St. Augustinegrass. If you suspect your grass has take-all root rot, first eliminate the possibility of these other problems.



Severe take-all root rot symptoms on St. Augustinegrass. Note the leaf yellowing, rotting stolons and bare ground.

Chinch bug infestation. To check for chinch bugs, mix 2 tablespoons of a liquid dishwashing detergent in a gallon of water and use a watering can to pour it evenly over a 1-square-yard area of the affected turf. Within minutes, the tiny chinch bugs will scurry about the turf. Adults are black, about 3/16 inch long, and have distinctive white wings. The immature nymphs are smaller and reddish, with a whitish band across the back. If you observe many chinch bugs, they might be the cause of the turf problem.



Characteristic infection pads (hyphopodia) of the take-all root rot fungus on a stolon of St. Augustinegrass, as seen under 400 x magnification with a compound microscope.

Rhizoctonia brown patch. Unlike leaves infected with take-all root rot, leaves infected with brown patch easily separate from the stolon with a gentle tug and often have a slimy, wet rot at the base of the leaf sheath. Brown patch does not cause root rotting, so the grass is not easy to pull from the ground as is the case with take-all root rot. Brown patch usually shows up in the autumn; infected turf recovers quickly as temperatures warm up in the spring.

Disease cycle

The fungus that causes take-all root rot is common in Texas, in both diseased and apparently healthy grass. It does not survive well in the soil without a host plant or plant debris, such as thatch. Turfgrass often shows the first symptoms of the disease from spring green-up through early summer, which suggests that the fungus infects the turf grass in the fall or early spring. However, the disease can occur at any time during the growing season,

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especially when the weather is warm and moist and grass is under stress. The disease is not spread by mowers or by normal traffic, but it can be spread by the movement of infected grass or infested soil.

Cultural disease management

Controlling take-all root rot (and bermudagrass decline, as it is also known) requires both cultural and chemical practices. The first step in preventing the disease is to take proper care of the grass, so that it grows at a moderate rate and there is abundant microbial activity in the root zone. Good surface and subsurface drainage is important. Turf areas that remain wet are prone to disease. Improve drainage if necessary and fill in any depressions in the soil. Avoid over watering. It is better to water infrequently but deeply (6 to 8 inches deep) than to give the grass frequent, shallow waterings.

Have your soil tested and fertilize grass on the basis of the test recommendations. Do not apply excessive rates of nitrogen fertilizer. If possible, adjust the soil pH in the root zone so that the pH is slightly acidic, preferably within the range of pH 6.0 - 6.8. You can help acidify the soil by applying elemental sulfur at a rate of 3 to 5 pounds per 1,000 square feet per year, split into several applications during the year. Another way to slowly acidify the root zone pH is to use fertilizer in which ammonium sulfate is the source of nitrogen. Research has shown that continued use of ammonium sulfate over a 2-year period can sometimes help reduce take-all root rot. However, be careful not to apply ammonium sulfate, or any

other soluble nitrogen fertilizer, at a rate higher than 1 pound of nitrogen per 1,000 square feet per application. Otherwise, you may encourage thatch buildup. With ammonium sulfate fertilizer you may need to make more frequent applications but at lower rates than usually recommended. Do not apply more than 4 pounds of nitrogen fertilizer per 1,000 square feet per year for St. Augustinegrass, or 5 pounds per 1,000 square feet per year for bermudagrass.

If thatch build-up is a problem, use a vertical mower to break up the thatch, aerate the soil with a core aerifier, and mow at the proper height (2 to 3 inches for St. Augustinegrass and 1 to 1.5 inches for bermudagrass).

Soil also should be aerified if it is compacted.

Fungicides

If take-all root rot or bermudagrass decline are a problem in your lawn, you will probably need to apply a fungicide. Fall and spring are the best times to do this. The following fungicides are labeled for the control of take-all root rot or have been shown to be effective in research tests: Banner[®], Bayleton[®], Eagle[®], Ferti-Lome Systemic Fungicide[®], Fung-Away Systemic Lawn Fungicide[®], Heritage[®], Ortho Lawn Disease Control[®], Spectracide Immunox[®], thiophanate-methyl products (Fungo 50[®], Cleary's 3336[®], Green Light Systemic Fungicide[®], and Proturf Systemic Fungicide[®]).

Fungicide should be applied in a high volume of water or watered in thoroughly right after application. This will ensure that the product moves into the grass root zone rather than drying on the leaves.

Common hose-end applicators work well for soaking the fungicide into the root zone. Fungicides are most effective as preventative treatments and much less effective after the disease has become well established. However, it is usually effective to treat diseased areas in the spring after the easily-removed, infected stolons are raked out or lifted away. Two applications 3 to 4 weeks apart may be required.

Always read and follow carefully any instructions and precautions on the product label. All the fungicides listed above, with the exception of the thiophanate-methyl products and Heritage[®], have growth regulator effects that may cause significant stress for bermudagrass when applied during the high temperatures of late spring and summer. Note: They do not contain growth regulators, but the fungicides may cause growth regulator effects.

Take-all root rot usually becomes a serious problem only when turfgrass is under stress because of soil compaction, temperature extremes, herbicide injury, imbalanced soil fertility, excessive shade, improper mowing height or frequency, excessive and too frequent watering, or any other condition that weakens the turf.

NOTE: Reference to commercial products is made for educational purposes and is not intended as an endorsement by Texas Cooperative Extension. Follow manufacturers' recommendations and precautions on all product labels. Products mentioned were labeled as of the date of publication. Labels may change, so it is important to always read the label.

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