



Take-all root rot of turfgrass

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Take-all root rot (patch) is a serious disease caused by the soil-borne fungus

Gaeumannomyces graminis var. *graminis*, which results in the development of brown, dead areas of 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, and on zoysiagrass and centipedegrass.

Symptoms and diagnosis

Symptoms of take-all root rot often become first noticeable in spring or early summer, but may appear at any time during the growing season. Early symptoms include yellowish (chlorotic), thinning turf in large, circular to irregular patches (1 foot to more than 20 feet in diameter). The roots are usually short, blackened and rotted, and stolons can be easily lifted from the soil because of the poor root system. Nodes may also be discolored. The yellowish foliage eventually dies and becomes brown.

Take-all root rot may be mistaken for Rhizoctonia brown patch, white grub damage or chinch bug injury on St. Augustinegrass. If you suspect your turfgrass has take-all root rot, first eliminate the possibility of white grub or chinch bug infestation by examining it. To check for white grubs, cut three sides of a 12- x 12-inch section of sod to a depth of 4 to 6 inches with a shovel or spade. Fold the sod back like a flap and record the number of white grubs present. Return the



Severe take-all root rot (patch) symptoms on St. Augustinegrass showing leaf yellowing, rotting stolons and bare ground.

sod to its original position and water. Observe several locations within the affected area. White grub damage is common during the months of July through October. Four or more grubs per square foot suggest that white grubs may be the primary problem.

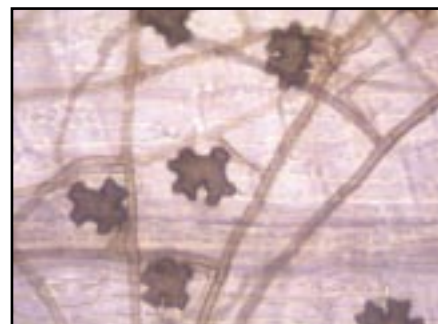
To check for chinch bugs, mix 2 tablespoons of a liquid dishwashing detergent in a gallon of water and pour it evenly over a 1-square-yard area of the affected turf with a watering can. Within minutes, the tiny chinch bugs

will scurry about the turf. Adults are black, about $\frac{3}{16}$ inch long, with distinctive white wings. The immature nymphs are smaller and reddish, with a whitish band across their back. If you see many chinch bugs, they might be causing the turf decline.

Rhizoctonia brown patch can be distinguished from take-all root rot. Unlike leaves infected with take-all root rot, individual yellowish, St. Augustinegrass leaves from brown patch-infected plants 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 extensive root rotting, the disease usually shows up in the fall, and turf recovers quickly as temperatures warm up in the spring.

Disease cycle

The take-all root rot fungus is commonly found in association with turfgrasses in Texas, both diseased and apparently healthy. It does not survive well in the soil without a host plant or infected plant debris, such as thatch.



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

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Turfgrass often shows the first symptoms of the disease from spring green-up through early summer, suggesting that the fungus commonly infects the turfgrass in the fall or early spring. However, the disease apparently can occur at any time during the growing season. High moisture conditions, moderately warm temperatures, and various stress factors on the turfgrass all favor disease development. The pathogen is not spread by mowers or by normal traffic, but can be spread by movement of infected turf or infested soil.

Cultural disease management

Control of take-all root rot and bermudagrass decline consists of both cultural and chemical practices. Good surface and subsurface drainage is important. Turf areas that remain wet because of poor drainage or depressions in the soil should be modified by supplying adequate drainage or by filling in any depressions in the soil. Avoid over watering. It is better to water infrequently but deeply (6 to 8 inches deep) only as the turfgrass needs water instead of shallow, frequent watering.

Balanced fertility, preferably based on a soil test, is important. Avoid adding too much 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. One way to slowly acidify the root zone pH is by using ammonium sulfate as the source of nitrogen when fertilizer is applied to the turfgrass.

Research has shown that continued use of ammonium sulfate over a two-year period can help reduce the incidence of take-all patch in some situations. Avoid applying soluble nitrogen fertilizer (such as ammonium sulfate) at rates higher than 1 pound of nitrogen per 1,000 square feet per

application to discourage thatch buildup. Thus the long-term use of ammonium sulfate may require more frequent applications but at lower rates than usually recommended. Do not exceed 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. Applying elemental sulfur at the rate of 3 to 5 pounds per 1000 sq. ft. in several split applications can also help acidify the soil.

If thatch build-up is a problem, try to dethatch and to prevent thatch accumulation by using a vertical mower, core aeration or spiking, proper nitrogen fertilization, and frequent mowing at the recommended height (2 to 3 inches for St. Augustinegrass; 1 to 1.5 inches for common bermudagrass). Consider aerating the soil if it is compacted.

Fungicides

Consider applying fungicide in lawns where take-all root rot or bermudagrass decline is a problem. Fall and spring applications of the fungicide appear to be most important to prevent disease. Fungicides that either are labeled to control these diseases or have been shown to be promising in research tests include: Banner[®], Bayleton[®] (triadimefon), Eagle[®], Rubigan[®], Sentinel[®], thiophanate-methyl (Fungo 50[®]), Cleary's 3336[®], Proturf Systemic Fungicide[®], Topsin-M[®]) and Heritage[®].

It is suggested that the products be applied in a high volume of water or that irrigation be applied immediately after application, before the fungicide dries on the leaves, so as to move the product into the root zone. Fungicides are most effective as preventive treatments and much less effective as curative treatments after the disease has become well established. However, satisfactory success has

been obtained by treating affected areas (patches) in the spring after the easily removable, infected stolons (runners) are raked out or lifted away and the soil is gently loosened with a spading fork or similar tool. Perhaps two or three applications at 3- to 4-week intervals may be required. Always read and follow carefully any suggestions and precautions on the product label. All of the above-mentioned fungicides, with the exception of thiophanate-methyl and Heritage[®], have growth regulator effects that may significantly stress bermudagrass when applied during the high temperatures often experienced during the late spring and summer.

It is thought that take-all root rot and bermudagrass decline usually become serious problems only after the turfgrass has been predisposed by various stress factors, such as soil compaction, temperature extremes, herbicide injury, imbalanced soil fertility, excessive shade, improper mowing height or frequency, excessive and too frequent watering, and any other factors that may weaken the turf and provide favorable conditions for disease development. Good turfgrass management that promotes moderate plant growth and provides conditions for abundant, diverse microbial activity in the root zone is the first step in preventing and managing this disease.

NOTE: Reference to fungicides is made for educational purposes and is not intended as an endorsement. Follow manufacturer's recommendations and precautions on all product labels. The above-mentioned products were labelled as of the date of publication of this information sheet. Labels change unexpectedly, thus it is important to always read the label.

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