

Take-all Root Rot¹

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Other Names: Bermudagrass decline

Pathogen: *Gaeumannomyces graminis* var. *graminis*

Turfgrasses Affected: All warm-season turfgrasses.

Occurrence: The pathogen is naturally present on warm-season turfgrass roots. High rainfall and stressed turfgrass trigger the disease, and it is therefore observed during the summer and early fall months when Florida receives the majority of its rainfall. Prolonged periods of rainfall are most conducive to this disease. Any stress placed on the turfgrass can encourage or worsen the disease.

Symptoms/Signs: This is a root rot disease (Figure 1). Because the roots are affected, they are not able to efficiently obtain water or nutrients from the soil, nor are they able to store the products of photosynthesis. Symptoms observed on the leaves are the result of pathogen activity on the root system. The fungus does not attack leaves.

Initial activity of the fungus on the roots can only be observed by looking at the roots. If the turfgrass is not stressed, or if it is under low levels of stress, leaf symptoms may never be observed. However, under

high stress conditions, symptoms can appear on the leaves. By the time the leaf symptoms appear, the pathogen has been active on the roots for at least two to three weeks—probably longer.



Figure 1. St. Augustinegrass roots rotted due to take-all root rot. Credits:

Initial symptoms aboveground are irregular, yellow (chlorotic) or light green patches ranging in diameter from a few inches to a few feet. Roots are initially thin and off-white in color with isolated black lesions. Eventually, roots become very short, black, and rotted. Stolons and rhizomes may have black lesions and, under severe disease conditions, begin to rot. Entire plants may die, resulting in irregular patches of thinning grass, and if the rot is not

1. This document is SS-PLP-16, one of a series of the Plant Pathology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date May 1991. Revised February 2011. Visit the EDIS website at <http://edis.ifas.ufl.edu>.
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controlled, bare patches may develop (Figures 2 and 3). Under a microscope, black strands of fungi (runner hyphae) and special structures called hyphopodia are visible on the outside of the roots, stolons, and rhizomes.



Figure 2. Early aboveground symptoms of take-all root rot.
Credits:



Figure 3. Turfgrass death caused by take-all root rot.
Credits:

Cultural Controls: This disease is very difficult to control once the aboveground symptoms are observed. Therefore, measures that prevent or alleviate stress are the best methods for controlling the disease or, at least, decreasing the potential damage. Stress on turfgrass can result from many factors and are addressed below.

The turfgrass *must* be mowed at the correct height during the summer (Figure 4). Turfgrass should be mowed as frequently as necessary so that only one third of the leaf tissue is removed during any one mowing event. Scalping the grass damages the growing point.

Balance nitrogen applications with equal amounts of potassium. For every pound of nitrogen

applied, an equal amount of elemental potassium should be applied. Slow-release nitrogen and slow-release potassium sources should be used. Avoid nitrate-nitrogen products and quick-release urea products (e.g., uncoated urea). If slow-release potassium is not readily available, then apply quick-release potassium to the turfgrass between nitrogen applications. Extra potassium may be useful in late summer and early fall. Apply micronutrients, especially manganese. Micronutrients should be applied in the sulfate form as foliar applications. When the disease is active, frequent foliar (leaf) feeding of all nutrients (N, P, K, and micronutrients) in small amounts is necessary if the root system is severely damaged; the roots do not function properly and are unable to obtain nutrients efficiently from the soil.



Figure 4. Healthy bermudagrass (green strip at top) cut at the correct height compared to severely diseased bermudagrass (bottom) cut too low. Credits:

Do not apply lime to the turfgrass. For centipedegrass, it is acceptable to apply elemental sulfur or iron sulfate to lower the soil pH to below 5.5, but do not do this with other turfgrasses.

Even when herbicides are applied correctly, there is some stress placed on St. Augustinegrass. St. Augustinegrass is especially sensitive to herbicides. Learn how to manage turfgrass to limit weeds using cultural management techniques and minimal amounts of herbicides. Apply herbicides according to the label. Refer to “Weed Management in Home Lawns” (<http://edis.ifas.ufl.edu/ep141>).

Chemical Controls: Azoxystrobin, fenarimol, myclobutanil, propiconazole, pyraclostrobin, thiophanate methyl, and triadimefon. These fungicides are not as effective as the use of cultural controls once the disease symptoms are observed. These fungicides are best used preventively, meaning they must be applied prior to symptom development. Start applying the fungicides at least one month prior to the time when aboveground symptoms are normally observed. Continue applying once a month until the weather is no longer conducive to disease development. These fungicides should be lightly watered into the root zone immediately after application.

For a homeowner's guide to turfgrass fungicides, see http://edis.ifas.ufl.edu/document_pp154. Check fungicide labels for site application restrictions, as some fungicides cannot be used on residential lawns. DMI (demethylation-inhibiting) fungicides have shown the potential to damage bermudagrass turf. Follow label directions and restrictions for all pesticides. The presence of a fungicide on this list does not constitute a recommendation.

Refer to the "Turfgrass Disease Management" section of the *Florida Lawn Handbook* (<http://edis.ifas.ufl.edu/lh040>) for explanations of cultural and chemical controls.