

Take-All Root Rot on St. Augustinegrass

Take-all root rot has emerged as a destructive disease of St. Augustinegrass. Disease outbreaks have been confirmed on St. Augustinegrass lawns and sod fields across Alabama as well as California, Florida, and Texas. This disease occurs in Alabama wherever well-managed St. Augustinegrass lawns and sod fields are found. All commonly grown St. Augustinegrass cultivars are susceptible to take-all root rot.

Frequent, heavy spring and summer rains in recent years may have contributed to widespread outbreaks of this disease. Take-all development may also be favored by heavy liming, use of nitrate nitrogen-containing fertilizers, and deficiencies of certain micronutrients.

The soil-inhabiting fungus *Gaeumannomyces graminis* var. *graminis* is the causal agent of take-all root rot on St. Augustinegrass. This fungus is also responsible for spring dead spot and bermudagrass decline on bermudagrass in Alabama, along with an undescribed patch disease of zoysiagrass and centipedegrass.

Symptoms

The first symptoms of take-all root rot usually appear in the spring and summer as yellowing (chlorosis) of the leaves, which gives the affected areas of the lawn a yellow-green cast (see Figure 1). Yellowing of the turf canopy can, however, indicate other problems as well. Similar symptoms can often be seen on turf suffering from chinch bug damage, certain nutrient deficiencies, or drought stress. Folding of the leaves along the midrib, another symptom of drought stress, may also be seen at early stages of the disease.

Later, severe thinning of the turf in circular to irregular patches ranging from 3 to more than 15 feet in diameter occurs as the infected stolons die (see Figure 2). If all the grass dies, ugly patches of bare ground, which are often invaded by grassy and broadleaf weeds, are left. Heaviest damage occurs on sunny sites; symptoms often are less severe on turf under heavy shade. St. Augustinegrass lawns suffering heavy take-all damage take on the appearance of a patchwork of dead, declining,



Figure 1. Patches of thin, yellow turf are an early symptom of take-all root rot on St. Augustinegrass.



Figure 2. Severe thinning on a take-all-damaged St. Augustinegrass lawn.

and healthy turf (see Figure 3). Stolons growing into the diseased turf often do not root very well, so the patches of declining or dying turf often persist from one year to the next (see Figure 4).

In southern Florida, where St. Augustinegrass does not go dormant, recovery of take-all-damaged turf often occurs during the winter. However, symptoms usually reappear the following summer.

Take-all root rot and brown patch, which can have similar field symptoms, are easily confused. On brown-patch-damaged turf, leaf sheaths and leaves are rotted, but the roots and stolons are often unharmed. On take-all-damaged St. Augustinegrass, the leaves and leaf sheaths are not damaged; the roots are usually dark brown to black in color and often badly rotted (see Figure 5). Few healthy white roots are seen on the infected stolons. Rotted roots are so brittle that the stolons can easily be pulled from the ground. A blackening of the nodes and stolons may also be seen. With the aid of a good hand lens, numerous tiny, gray, lobed hyphopodia, which definitively identify the causal fungus (see Figure 6), can be seen on the underside of the infected stolons.

St. Augustinegrass sod fields damaged by take-all usually exhibit the same yellowing of the foliage often associated with iron deficiency. Instead of patches of yellow turf, the entire sod field may be off-color. Although the typical turf dieback is rarely seen in sod fields, damaged St. Augustinegrass sod often fails to knit properly and may fall apart when lifted for harvesting.

Take-all root rot is not confined to any particular soil type. In Alabama, the disease occurs on soils ranging from fine sandy loams and sands of the Lower Coastal Plain to blackland prairie clays of the Blackbelt.

Control

St. Augustinegrass cultivars apparently have no resistance to take-all root rot. In Alabama, lawns and sod fields planted to the cultivars Common and Raleigh have suffered heavy damage, while the cultivars Floratam, FX-10, and Jade have been attacked by the take-all root rot fungus in Florida. In California, the take-all root rot fungus has been isolated from the St. Augustinegrass cultivars DelMar, Jade, Dalsa 8401, Mercedes, Bitterblue, Standard, California Common, Sunclipse, Raleigh, Seville, and Floratam.

Management Practices. Specific control strategies for take-all root rot have not been developed. However, based on experience with other patch diseases incited by *G. graminis* var. *graminis*, some control recommendations are suggested. Turfgrass management practices, not chemicals, offer the best hope for controlling this disease.

Nitrogen sources may affect the occurrence of St. Augustinegrass take-all root rot. On several turfgrasses and small grains, fertilizers containing nitrate nitrogen (ammonium nitrate and calcium nitrate) increased the severity of diseases similar to take-all root rot, so their use should be avoided when possible. Although no association between use of nitrate nitrogen and the development of take-



Figure 3. Patchwork of declining and dead turf on a mature St. Augustinegrass lawn.



Figure 4. Poor stolon growth across the badly thinned patches greatly slows turf recovery and may often result in the appearance of large areas of bare ground.



Figure 5. Roots on diseased stolons are discolored and brittle.

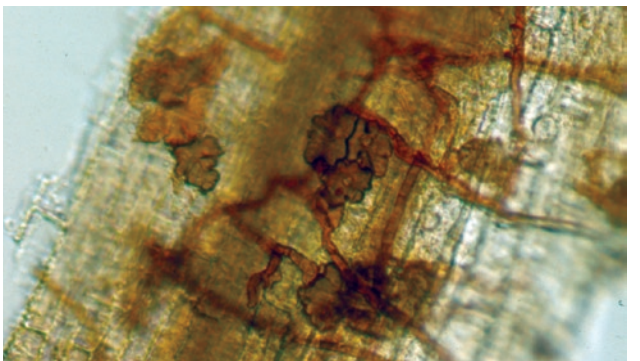


Figure 6. Lobed hyphopodia of *G. graminis* var. *graminis* are usually found on the underside of St. Augustinegrass stolons.

all root rot has been shown, ammonium-containing fertilizers (such as ammonium sulfate, urea, and ammonium chloride) are the preferred nitrogen sources for well-managed St. Augustinegrass lawns and sod fields. Light monthly applications of nitrogen fertilizers or the use of a slow-release fertilizer to maintain moderate turf growth throughout the growing season is also recommended. Heavy nitrogen fertilization may contribute to disease development.

The development of take-all disease on wheat has been linked to a deficiency of the soil mineral manganese. Foliar applications of a micronutrient supplement containing manganese and other essential minerals may temporarily correct mineral deficiencies. Soil applications of manganese sulfate can be made to correct serious manganese deficiencies. However, most Alabama soils have sufficient manganese, but it may not be available to the turf. Using ammonium nitrogen and/or chloride-containing fertilizers will increase manganese availability to the plant. Muriate of potash is a good source of both chloride and potassium. For best results, apply nitrogen and potassium in a 2:1 ratio (apply 1 pound of actual potassium for every 2 pounds of actual nitrogen used).

Heavy liming has also been linked to increases in take-all and a reduction in the availability of manganese. Maintain soil at pH 5.5 to 6.0 on intensively managed St. Augustinegrass lawns. To reduce the risk of disease, apply no more than 10 to 20 pounds of lime per 1,000 square feet of turf per season. Use acid-forming fertilizers on sites with near-neutral to alkaline soils (pH 7.0+) to lower the soil pH.

Other management practices such as raising the cutting height for drought-stressed lawns, timely irrigation, and improving drainage in wet areas may also help control take-all on St. Augustinegrass. Raising the cutting height keeps the turf from being scalped and provides more leaf area to support the damaged root system.

Renovation. Since recovery of take-all-damaged St. Augustinegrass is often poor, complete renovation of take-all-damaged lawns may be necessary. However, laying new St. Augustinegrass sod over areas where take-all has occurred may not be advisable. In at least one case, new sod succumbed to take-all root rot within a year.

Bermudagrass and zoysiagrass may not be the best replacements for St. Augustinegrass, because both are hosts of the take-all root rot fungus. With proper management and timely fungicide treatments, however, the risk of spring dead spot on both turfgrasses can be minimized. Also, fungicides are available that will control spring dead spot on bermudagrass (see Extension publication ANR-371, "Control of Spring Dead Spot and Bermudagrass Decline on Bermudagrass"). Centipedegrass may be

the best replacement turf since few cases of take-all have been reported on this turfgrass.

Chemical Controls. To date, the effectiveness of fungicides against take-all root rot on St. Augustinegrass has not yet been demonstrated. Several fungicides have been registered for the control of take-all diseases caused by *G. graminis* var. *graminis*. Due to their high cost, fungicides are recommended only as preventive treatments on commercial and residential lawns previously damaged by this disease. To reduce the cost of treatment, fungicide applications may be limited to damaged parts of the lawn and surrounding healthy turf.

Before applying fungicides, core aerify or verticut diseased areas. Do not apply fungicides immediately after a heavy, soaking rain. Irrigate the fungicide into the soil with 0.5 to 1.0 inch of water. Fungicides cleared for take-all control on turfgrasses are listed in the table below. Additional information

concerning fungicide use for the control of take-all root rot and similar patch diseases is summarized in ANR-500-B, *Alabama Pest Management Handbook—Volume 2*.

Additional Reading

Elliott, M. L., A. K. Hagan, and J. M. Mullen. 1993. Association of *Gaeumannomyces graminis* var. *graminis* with a St. Augustinegrass root rot disease. *Plant Dis.* 77:206-209.

Elliott, M. L., and P. J. Landschoot. 1991. Fungi similar to *Gaeumannomyces* associated with root rot disease of turfgrasses in Florida. *Plant Dis.* 75:328-241.

Huber, D. M., and T. S. McCay-Buis. 1993. A multiple component analysis of the take-all disease of cereals. *Plant Dis.* 77:437- 447.

Wilkinson, H. T., and D. Pederson. 1993. *Gaeumannomyces graminis* var. *graminis* infecting St. Augustinegrass selections in Southern California. *Plant Dis.* 77:536.

Chemical Control of Take-All Root Rot on St. Augustinegrass

Fungicide	Rate per 1,000 sq. ft.	Comments
azoxystrobin Heritage 50W	0.4 oz.	Make 2 applications at 28-day intervals in spring or fall.
propiconazole Banner Maxx	2 - 4 fl. oz.	Make 1 to 2 sprays in April and May and again in September and October at 4-week intervals.
triadimefon Bayleton T/O	2.0 oz. 4.0 oz.	Preventive: Start sprays 2 to 4 weeks before symptoms reappear. Re-apply every 3 to 4 weeks. Apply 2 to 4 gallons of spray volume per 1,000 square feet. Thoroughly water after each application. Curative: Make 1 to 2 sprays on a 2- to 3-week interval followed by the preventive rate at 3- to 4-week intervals. Follow recommended cultural practices to suppress disease. Apply 2 to 4 gallons of spray volume per 1,000 square feet. Thoroughly water after each application.

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Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency and the Alabama Department of Agriculture and Industries. If a registration is changed or cancelled, the rate listed here is no longer recommended. Before you apply any pesticide, check with your county Extension agent for the latest information.

Trade names are used **only** to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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3.5M, Revised Oct 2004, ANR-823

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ANR-823