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Texas AgriLife Extension Service, Uvalde Center



## TAKE-ALL ROOT ROT OF TURF

**Other common disease name:** Take-all patch

**Pathogen:** *Gaeumannomyces graminis* var. *graminis*, fungus

**Distribution:** Widespread in alkaline soils

**Susceptible turf grasses:** St. Augustinegrass, bermudagrass, zoysia

**Symptoms:** Take-all root rot (TARR) causes turf to yellow, thin, and die in irregular patches ranging in size from several inches to 20-30 ft or more. Weeds eventually grow in thin or dead areas. A gentle pull on affected stolons (horizontal stems) easily removes the plants from the soil due to a rotted root system (however, white grubs can also remove roots). Roots, nodes, internodes, and the base of leaf sheaths can all be damaged. The disease is most noticeable in spring and summer months. TARR may occur with brown patch caused by another soil fungus, *Rhizoctonia solani*. TARR can be active year round, but brown patch usually peaks in wet cool weather in spring and fall.

Leaf blades may yellow or bronze before leaf sheaths, leaf blades, and stolons die. Dying leaves do not separate easily from the plant with TARR as they do with brown patch. Green stolon internodes may be partially coated with dark fungus mycelium visible to the naked eye (easily visible with hand lens). Reminiscent of soot, this mycelium is easily scraped off the green internodes with a fingernail or knife. On the dark fungus strands, tiny dark fungal structures (lobed hyphopodia) shaped like a jigsaw puzzle piece can be seen on green stolons, dead stolons, and leaf sheaths using a hand lens or microscope with 20x or greater magnification. As TARR progresses, infected nodes and stolons turn brown and decay.

**Conditions that Favor Disease Development:** TARR may contribute to rapid turf die-off in late spring or early summer as stress increases (Table 1). Infection occurs year round and major root damage may occur during the cool season. The TARR fungus is very widely distributed in Texas and can usually be found in apparently healthy turf. Deep-rooted turf constantly growing at a modest rate in the warm season can tolerate the fungus much better than turf that is periodically stressed to the point that growth slows or stops, or shallow-rooted turf growing too rapidly. The fungus readily survives in soil, turf debris and thatch. Re-sodding will not permanently solve the problem.

Most control efforts should focus on management for a turf growing environment that encourages modest constant growth but is unfavorable to the TARR fungus (Table 1). Most <sup>2</sup>Plant disease epidemics occur when on all three parts of the Plant Disease Triangle are in place. For TARR control, managing the Environment is most important, followed by Host, then Pathogen.

homeowners can maintain acceptable turf without fungicides.

Several fungicides are labeled for managing TARR of turf species and most use is on sports turf (Table 2). Fungicides are more effective as preventative treatments than rescue treatments after loss has occurred. Fall treatment should probably be a higher priority than treating at spring green up. Fungicides have only a temporary effect and do not eradicate the fungus from soil or turf. Fungicides can be expensive and repeated use of a single active-ingredient may lead to buildup of fungal strains that are resistant to the fungicide. Irrigation is required after application to move the fungicide into the root zone.

**References to specific fertilizers and fungicides are made for educational purposes and are not intended as an endorsement. Follow manufacturer’s recommendations and precautions on all product labels.**

**Table 1. Take-all root rot (TARR) risk factors and management suggestions.**

| <b>Risk factors</b>  | <b>Management suggestions</b>   |
|--|---|
| Thin top soil over limestone   | Minimum top soil depth is approximately 6 in. for turf, but it is very difficult to maintain soil moisture and quality turf in thin soil. Consider non-turf landscape alternatives for thin soils. <sup>w</sup>   |
| Low mowing height [symptom: stolons (runners) readily visible after mowing]                              | Raise mower blade (2.5-3 in. for St. Augustinegrass) to increase shading of soil surface, help control weeds, reduce soil temperature in summer, protect from hard freezes, and reduce evaporation from the soil surface.   |
| Infrequent mowing that removes more than 1/3 of leaf area.   | Mow at least weekly when turf is growing rapidly.   |
| Bagging or raking lawn clippings   | Mow often with mulching mower that drops small clippings into turf to slowly decompose on site and recycle nutrients. “Don’t Bag It!” <sup>x</sup>  |
| Lack of organic matter at soil line  | In spring on established turf, apply about 0.75 in. layer of fine textured organic matter. Rates for peat moss are 1 13-lb. (2 cu.ft.) bale/500 sq.ft. or 1 3.8-cu.ft. bale /1000 sq.ft.; repeat every 2 years. Local sources of fine sieved organic matter should give similar results. <sup>y</sup> |
| Drought stress (year round) [symptom: footprints visible after walking across turf, deep cracks in soil] | Use appropriate irrigation equipment and scheduling to achieve uniform soil moisture without wasting water.   |
| Summer heat  | Raise mower blade height. Irrigate as needed to prevent severe wilting between irrigations.   |
| Excess phosphorus (P) on alkaline soils ties up iron (Fe) and zinc (Zn) needed for normal growth         | Most lawns in southwest Texas need only nitrogen (N) (21:0:0, ammonium sulfate). Apply phosphorus (P) and potassium (K) only if deficiencies are indicated by soil test results. Three numbers in fertilizer ratios indicate percentages: N:P:K.  |
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| Table 1, continued   |   |
|--|---|
| Deficiencies of Fe and Zn (minor elements) [symptom: yellowing, slow growth]   | Apply Fe and Zn <sup>z</sup>  |
| Excessive nitrogen fertilizer [symptom: very rapid growth rate requiring very frequent mowing]   | N rate recommendations vary according to goals and management. Quality of informal turf may be acceptable with 1 lb actual N/1000 sq.ft./application once or twice a year. Fertilizers have a high salt index and excess rates can injure turf. |
| Frequent irrigation [symptom: excessive growth rate, thatch accumulation where clippings not removed, shallow root systems].   | Infrequent 1-in. irrigations favor deep root systems. Gradually decrease irrigation frequency and increase quantity for established turf accustomed to frequent light irrigations.  |
| Low lying or poorly drained areas that remain saturated after irrigation or rain [symptom: standing water, algal growth]   | Improve surface drainage (divert rain water; cut and fill when establishing landscape, but not near existing trees) and internal drainage (topsoil choice).   |
| Soil compaction from past or current traffic) or impervious clay layer (soil type or cultivation history) [symptom: bare soil at paths; roots do not penetrate a dense soil layer] | Aerate to improve root health with spike or core (preferred) aerating apparatus. Avoid heavy traffic from vehicles, animals, and humans, especially when soil is saturated after rain or irrigation.  |
| Insect damage (chinch bugs, white grubs, "bermudagrass" scale)   | Insect problems can enhance TARR. Sample and examine carefully (or submit for diagnosis) to confirm insects, then manage and/or treat. Alleviating stress may preclude need for pesticide to control scale.                                     |
| Turf herbicides (all weed control products stress turf to some extent, including fertilizer + herbicide products)  | Avoid herbicides if possible. Many weeds can be controlled by frequent mowing with high blade and with hand weeding.  |
| Variety with low vigor   | Floritam variety of St. Augustinegrass is more vigorous than Raleigh and several other varieties. Floritam has large stems, coarse texture, and may suffer freeze injury below 10 F.  |
| Shade [symptom: thin turf under trees and near structures]   | Reduced growth rate may enhance TARR. St. Augustinegrass has more shade tolerance than bermudagrass and zoysia. Prune trees in winter to remove low-hanging and interior canopy limbs. Use non-turf plants in dense shade.                      |
| Winter injury  | Irrigate to provide some soil moisture before a severe freeze.  |
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| Table 1, continued   |  |
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| Salinity buildup where water quality is low                              | Avoid high fertilizer rates and frequent light irrigations with sprinklers. Irrigate infrequently but generously to leach salts through the soil profile. Gypsum top dressing may be appropriate.            |
| Alkaline (high pH) soils (often with caliche or white limestone subsoil) | Alkaline soils cannot be made acid. Elemental (agricultural) sulfur at 1-2 lbs/1000 sq ft/year in multiple split applications may temporarily decrease the surface soil pH and release some bound Fe and Zn. |

<sup>w</sup>Practical turf areas and other Texas Xeriscape suggestions can be downloaded from: <http://tcebookstore.org/tmppdfs/17675348-B1584.pdf>

<sup>x</sup>Information on recycling lawn clippings in place with mulching mowers, and on mulching turf with fine screened organic matter can be found at: <http://aggie-horticulture.tamu.edu/county/smith/tips/turf/dontbagit.html> and <http://plantanswers.tamu.edu/drought/mulches.html>

<sup>y</sup>Based on work by P. Colbaugh et al., TAMU AREC Dallas and J. Parsons TCE San Antonio.

<sup>z</sup>Example: 10 oz. per 1000 sq ft. Lesco product #084050 (Lesco Service Center, 11002 Iota Dr., San Antonio, TX 210-590-2047; 12-0-0 with multiple chelated minor elements (microelements) including Fe and Zn; N rate is negligible due to the low rate. Other minor element products from other sources may perform similarly. Work by Roger Havlak, TCE, San Antonio.

**Table 2. Fungicide active ingredients labeled in 2010<sup>y</sup> for management of take-all root rot (take-all patch). Other trade names not listed with the same active ingredients are also labeled for use on turf grasses. Follow all label directions.**

| Active ingredient(s)                        | Trade name(s)   |
|---|---|
| azoxystrobin                                | Heritage  |
| azoxystrobin + propiconazole                | Headway   |
| chlorothalonil <sup>z</sup> + fluoxastrobin | Disarm C  |
| fenarimol                                   | Rubigan   |
| fluoxastrobin                               | Disarm  |
| myclobutanil                                | Eagle, Myclobutanil                                     |
| propiconazole                               | Banner MAXX, Kestrel, Propiconazole Pro, Savvi, Strider |
| pyraclostrobin                              | Insignia  |
| thiophanate-methyl                          | 3336  |
| triadimefon                                 | Bayleton  |
| Trifloxystrobin + triadimefpm               | Armada  |
| triticonazole                               | Trinity, Triton   |

<sup>y</sup>Source: E.L. butler and L. Tredway, 2010. Turfgrass disease control. <http://ipm.ncsu.edu/agchem/6-toc.pdf>

<sup>z</sup>Products containing chlorothalonil, iprodione, and vinclozolin are no longer labeled for use on home lawns.