Disease and Disorders of Golf Greens in Louisiana

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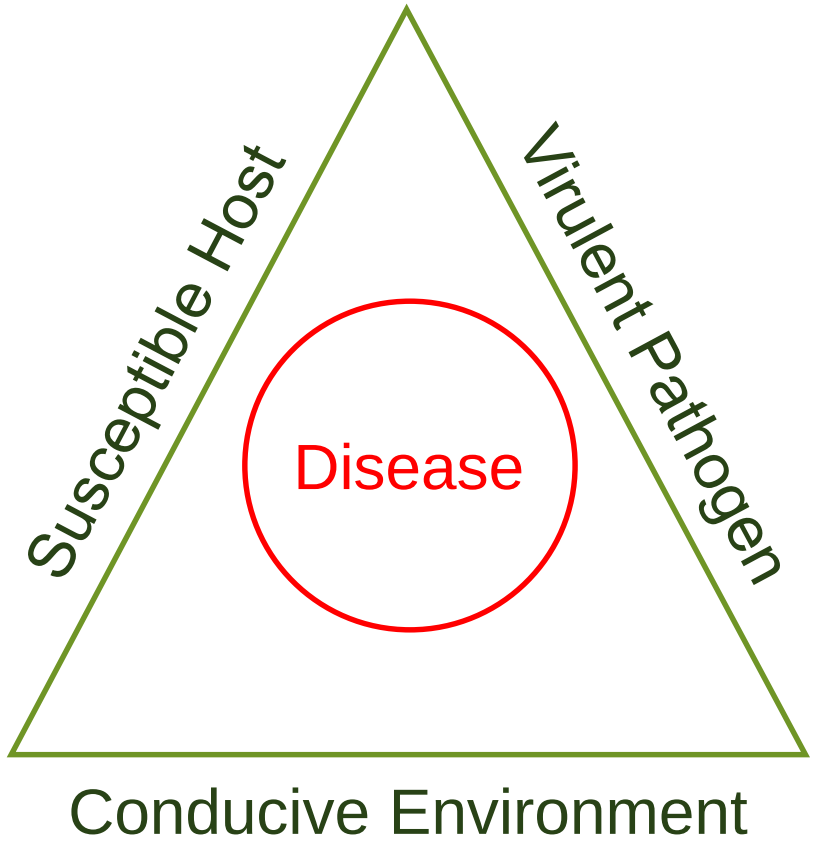
Disease triangle



Disease Vs. Disorder

- Infectious Agents (biotic or living)-**Disease**
  - Can be transmitted from one plant or plant part to another
  - Oomycetes, fungi, bacteria, viruses, nematodes….
- Non-infectious Agents (nonliving)-**Disorder**
  - Cannot be transmitted from one plant or plant part to another
  - Environmental extremes, chemical misuse, nutrient deficiencies or toxicities

Bermudagrass decline

- Less fertile, compacted & poor drained soils
- Increase in soil pH & liming favors disease
- Thatch accumulation
- Exceptionally low mowing height
- Adverse weather conditions
- Excess nitrogen, potassium & manganese deficiency
- Excessive irrigation

Bermudagrass decline Mgmt.

- Maintain soil pH between 5.5-6.0
- Slow-release acidifying source of N & apply adequate potassium & micronutrients
- Raise mowing height
- Core aerification to improve drainage & reduce compaction
- Eliminate excessive irrigation or water stress
- Avoid root inhibiting herbicides

Bermudagrass decline Mgmt.

- Fungicides
  - azoxystrobin+difeconazole (Briskway)
  - azoxystrobin+Propiconazole (Headway)
  - fenarimol (Rubigan)
  - penthipyrad (Velista)
- Preventative are more effective
- Spray volume
- Curative during high disease pressure

Fairy rings

- Three types
- The pathogen do not infect the turf directly, but it creates environment that can adversely affect the turf
- Type I and II are more common during hot dry weather and type III during extended wet weather
- Type I is the most damaging due to hydrophobic soil and thatch conditions created by the fungus

Fairy ring type I

Fairy ring type II

Fairy ring type III

Fairy ring Mgmt.

- Minimize thatch build up by vertical mowing or power raking
- Aerify and top dress on regular basis
- Regulate soil moisture
- Maintain balanced soil fertility
- Once established, it is difficult to eliminate the problem and may require extreme measures to manage it

Fairy ring Mgmt. (source: NC State)

Fungicide and Formulation[1]	Amount of Formulation[2]	Application Interval[3]	Efficacy Rating	Resistance Risk
azoxystrobin (Heritage, Strobe) (Heritage TL) (Heritage G)	 0.4 2 2 to 4 lbs	 28 28 14 to 28	+++	Low
azoxystrobin + acibenzolar-S-methyl (Heritage Action)*	0.2 to 0.4	14 to 28	+++	Low
azoxystrobin + difenoconazole (Briskway)*	0.5 to 0.725	14 to 28	+++	Low
azoxystrobin + propiconazole (Headway) ME G	 1.5 to 3 2 to 4 lbs	 14 to 28 14 to 28	+++	Low
azoxystrobin + tebuconazole (Strobe T)*	0.75 to 1.5	28	++++	Low
chlorothalonil + fluoxastrobin (Fame C)*	4.5 to 5.9	21 to 28	+++	Low

Fairy ring Mgmt.

Fungicide and Formulation[1]	Amount of Formulation[2]	Application Interval[3]	Efficacy Rating	Resistance Risk
fluoxastrobin (Fame) SC G	 0.28 to 0.36 2.3 to 4.6 lbs	 21 to 28 28	+++	Low
fluoxastrobin + tebuconazole (Fame T)*	0.45 to 0.9	21 to 28	++++	Low
flutolanil (Prostar)	2.2 to 4.5	21 to 30	+++	Low
metconazole (Tourney)	0.37	21	++++	Low
penthiopyrad (Velista)	0.5 to 0.7	14 to 28	+++	Low
polyoxin D (Affirm) (Endorse)	 1 4	 7 7	++	Low
pyraclostrobin (Insignia) WG SC	 0.9 0.7	 28 28	+++	Low
pyraclostrobin + boscalid	1.1	28	+++	Low

Blue green algae

- Areas where turf is thinned out & light, water & air cannot penetrate beyond thatch surface
- Severe under warm humid conditions during late spring, summer & early fall favor algal growth
- Low mowing heights, shady conditions, poor soil drainage & frequent irrigation also favor growth of algae
- May lead to development of black layer

Blue green algae Mgmt.

- Maintain healthy turf stand
- Avoid any abiotic stresses
- Mow at recommended height
- Fungicides
  - Daconil, Fore, Junction, Medallion, Spectro

Black layer

- Physical condition of soil with high sand content
- Anaerobic conditions occur due to lack of oxygen
- Common in water logged soils due to improper irrigation, excessive rains or soil compaction
- Production of hydrogen gas in the root zone
- Roots rot and the turf decline
- Black layer results when H_2S combines with Fe^{++} to form a sulfide precipitate

Black layer Mgmt.

- Avoid anaerobic conditions
- Avoid water logging conditions
- Core aerification and reduce compaction
- Good fertilization practices
- Avoid water sources that are alkaline for irrigation

Disease management strategies

- Reduce (or eliminate) initial inoculum, or prevent its introduction
  - Start clean & stay clean
- Reduce the time of exposure of the turfgrass
  - Exploit the environment
- Reduce the rate of disease development
  - Integrated disease management

Thatch management

Figure 1. A zoysiagrass soil profile showing less than 0.5-inch thatch accumulation (left) compared to zoysiagrass soil profile showing 2.0 inches of thatch (right).

Fungicide use

- Follow label
- Preventative vs. Curative
- Fungicides labeled for golf courses
- Fungicide effectiveness
- Time of application
- Fungicide resistance management (FRAC Codes)

Rapid Turfgrass Diagnosis

Rapid turfgrass diagnosis is a new service offered by the LSU AgCenter Plant Diagnostic Center for the turfgrass industry. This service includes a preliminary diagnosis and recommendations within 24 to 48 hours of receiving the sample followed by a complete diagnosis and recommendations about additional best management practices.

The service includes diagnosis and identification of biotic causes, including fungi, bacteria, viruses, insect pests, nematodes and some abiotic causes. The abiotic causes are based on visual observations only and limited to herbicide, cold or frost injury. This service also includes measurements of the pH and EC (soluble salts) of the sample.

What is NOT INCLUDED in the diagnosis?

The service does not include on-site visits, weed and plant identification, plant and soil nutritional analysis, pathogen detection from water, chemical residue analysis and other abiotic causes.

How to COLLECT samples

Samples should contain plant tissue with early and advanced stages of disease development. Collect turfgrass samples from a transition zone between healthy and affected turfgrass containing both healthy and affected turf. Cup cutter samples (figure 1) are preferred. Submit a minimum of two samples from each problem area. Samples containing completely dead grass will not be diagnosed, and you will be asked to provide another sample.

Figure 1. Cup cutter sample for rapid turfgrass diagnosis

How to PACK samples

Wrap samples in newspaper or aluminum foil and place them in a sturdy cardboard box. Do not add any water to the samples. Always remember to include the completed Rapid Turfgrass Diagnosis Sample Submission Form with each sample. Samples without submission form and diagnostic fee will not be diagnosed.

How to SUBMIT samples

Send samples immediately after collecting them. Plan delivery for early in the week by using an overnight delivery service. Turfgrass samples are not received on Saturdays, Sundays and other LSU AgCenter holidays.

What is the MAILING ADDRESS for submitting samples?

Plant Diagnostic Center
302 Life Sciences Bldg.
LSU Campus
Baton Rouge, LA 70803

How much does it cost?

In-state: $75 per sample

Out-of-state*: $100 per sample

Make checks payable to
LSU AgCenter PDC

***Note: Out-of-state disease samples must include USDA APHIS permit for interstate movement of plant material.**

Questions???

www.lsuagcenter.com/plantdiagnostics

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