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Extension FactSheet

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Gray Leaf Spot on Turfgrass

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Gray leaf spot is a disease of increasing importance in the turfgrass industry in the United States. It has been a chronic disease in St. Augustinegrass *(Stenotaphrum secundatum)*. Recently, gray leaf spot was also reported to cause a serious problem in common cool season grasses, including annual ryegrass *(Lolium multiflorum),* perennial ryegrass *(Lolium perenne;* Figure 1), and tall fescue *(Festuca arundinacea)*. The same fungus causes blast on rice. Rice blast is one of the most devastating diseases in rice-growing regions worldwide.

Causal Organism

The sexual stage producing ascospores was found in the fungus infecting rice, and so the rice blast fungus is generally called *Magnaporthe grisea.* In turfgrasses, ascospores have not been observed, and the gray leaf spot fungus is referred to *Pyricularia grisea.* Host range of the fungus is more than 50 grass species, including wheat, crabgrass, and foxtail as well as rice and turfgrass. However, individual isolates of the fungus are limited to infecting one or a few host species. For example, *P. grisea* isolate from perennial ryegrass cross-infects tall fescue, but it is less likely to infect rice. In contrast, the fungus isolated from rice rarely infects turfgrass. Molecular analyses indicate that the fungus infecting turfgrass is distantly related to the fungus infecting rice.

Figure 1. Gray leaf spot on a closely mowed perennial ryegrass fairway.

P. grisea is distributed over a wide geographic region. Although regarded as a major disease on St. Augustinegrass, recent epidemics on perennial ryegrass and tall fescue in the Mid-Atlantic States and the Midwest have expanded the scope of this deadly disease. It was not until 1996 that the disease was confirmed in Ohio (Figure 2). The disease has become one of the important emerging turfgrass diseases. The pathogen kills the plant from severe leaf blight. Part of the blighting process involves the production of phytotoxic chemicals that disrupt the normal biochemical and physiological balance within the turfgrass.

Signs and Symptoms

Gray leaf spot gets its name from the production of gray conidia (spores) on infected necrotic tissues, and the devastating scorched appearance on foliage of turfgrass as the disease progresses during hot and humid weather. Quite literally, severe outbreaks look as if the turfgrass has been scorched with a flamethrower!

On St. Augustinegrass, the symptom of gray spot shows distinctive spots (Figure 3). Tiny lesions enlarge rapidly into spots that are first round, then round to oval, and later elongate across the entire leaf blade. The leaf spots are tan to gray, often depressed at the center, with irregular purple to brown margins.

On cool season grasses, gray spot may not be noticeable. Initial symptoms often appear as tiny pinprick lesions, which often go unnoticed or are mistaken as another less-aggressive disease. Under optimal environmental condi-

Figure 2. Gray leaf spot on perennial ryegrass at the softball stadium of The Ohio State University.

Figure 3. Resistant St. Augustinegrass cultivar FX-10 (two leaves on the left) and susceptible St. Augustinegrass cultivar Floratam (two leaves on the right), when *P. grisea* conidia were artificially inoculated and incubated seven days in the growth chamber.

tions and on susceptible hosts, these small spots quickly turn into water-soaked lesions which then coalesce together and progress rapidly to twisted necrotic leaf tips (Figure 4). If left unchecked, the disease moves rapidly to other susceptible plants.

The onset of gray leaf spot has been described as a general chlorosis of the sward followed by a rapid blighting of the entire plant. This is an unforgiving disease. In later stages of disease development, the sward may take on a gray color as a result of the mass production of conidia by the pathogen. Waterdrop-shaped conidia can be found on gray-leaf-spot-infected leaves (Figure 5). This feature is a key to accurate diagnosis of this disease.

Management Cultural

Balanced maintenance practices that reduce stress should be used for gray leaf spot management. Adequate nitrogen fertility is recommended, but AVOID high nitrogen application rates during summer months. Overfertility causes excessively lush turfgrass that is susceptible to gray leaf spot infection. Using a spoon-feeding approach at a rate of less than 0.25-lb of nitrogen per 1,000 ft^2 every seven to 10 days seems to be a good alternative.

Practices that alleviate or reduce drought stress, excessive leaf wetness, and soil compaction should be employed. Soil moisture levels and irrigation should be closely monitored to avoid overwatering. Turfgrass should be scouted on a regular basis, and appropriate and immediate reactions should be implemented. This is critical for this disease because a rapid outbreak can occur under ideal environmental conditions and susceptible hosts.

Figure 4. Leaves of perennial ryegrass infected by *P. grisea* become scorched and twisted.

Chemical

QoI (strobilurin-like fungicides including azoxystrobin and trifloxystrobin) and thiophanate-methyl can be used preventatively for gray leaf spot. Application of these fungicides should begin prior to the onset of disease — around August 1 — and continue every two to three weeks as needed when the muggy weather prevails.

Another potential problem is the development of resistance to these fungicides by *P. grisea.* Thiophanate-methyl resistance has been found in *M. grisea* isolates from rice. Dr. Vincelli of the University of Kentucky first reported resistance to QoI fungicides in *P. grisea* isolates from turfgrass in 2002.

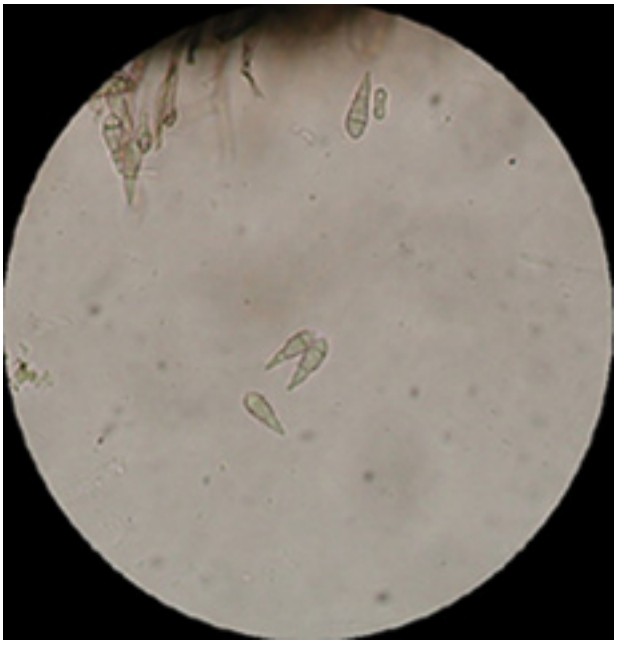

Figure 5. Waterdrop-shaped conidia of *P. grisea* under the compound microscope.

To reduce the risk of resistance to systemic fungicides, consecutive application of fungicides having a similar mode of action should be avoided. Tank-mixing of fungicides having different modes of action during periods of high disease pressure and switching from QoI fungicides and thiophanate-methyl to other products (i.e., demethylation inhibitors or contact fungicides) during periods of low disease pressure are recommended.

Genetic

Annual ryegrass is more susceptible than perennial ryegrass to gray leaf spot. Little is known regarding genetic resistance of commonly seeded perennial ryegrass cultivars to gray leaf spot. All currently available cultivars can be severely affected by gray leaf spot.

Care should be taken when it comes to interpreting what little genetic resistance data are available because of the limited scope and reproducibility of the evaluation trials. Preliminary data from the University of Kentucky turfgrass science program indicate a high degree of genetic similarity among *P. grisea* isolates collected over a wide geographic area. This means that once plant genetic resistance is found to the pathogen, it may be highly stable. Why? The less genomic variance among the fungus isolates, the less chance that the fungus develops and selects genes to avoid the plant defense mechanism.

Biological

No biological control is available now.

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