Take Home Messages for Take-All Patch

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As of August 1st, the summer of 2003 has turned out to be relatively quiet for the Turfgrass Diagnostic Lab. Moderate temperatures and some cool nights have held the most destructive turfgrass pathogens at bay. The lab has received several samples from golf courses, but there has only been one disease that has been diagnosed more than a couple of times. With thirteen diagnoses this year, take-all patch is the disease that superintendents are having the most trouble with.

Take-all patch is most common on recently established bentgrass stands that were seeded on sandy soil or cleared woodlands. The disease is more prevalent in wet years and is regularly a problem in low areas and areas with poor drainage. Additionally, there is a reported correlation between increased severity of take-all patch and the application of lime, alkaline fertilizers, and calcareous sand. Because of this, the pH of the thatch and upper root zone has been recognized as being an important factor of disease development, whereas incidence of disease is rare when pH is below 5.5 (Smith et al., 1989). The role pH has on the disease cycle is still not well understood, but may be attributed to direct inhibition of the pathogen, increased vigor of the host plant, or alteration of the microbial composition of the soil (Dernoeden, 1987).

Take-all patch is caused by the root infecting fungus *Gaeumannomyces graminis* var. *avenae*. The pathogen infects and colonizes the roots of several grass species, but the bentgrasses (creeping, colonial, and velvet) are the only turfgrasses to be severely damaged. Severe outbreaks occur in poorly drained areas and during periods of prolonged rainfall. The pathogen is most active when the soil temperature of the root zone is

between 50 and 65°F. Colonized roots and crowns appear dark brown to black in color and microscopic examination of affected tissue reveals dark brown runner hyphae of the pathogen (Figure 1). Vegetative movement of the fungus through thatch and root zone is very slow (up to six inches per year), whereas movement on soil cores and infested equipment is much more rapid. In the fall *G. g.* var. *avenae* may produce perithecia (fruiting structures) on the base of colonized plants that release windblown ascospores for long distance dispersal of the fungus (Couch, 1995).

Early symptoms of the disease are first noticed as circular patches of off-white or bronze turfgrasses that are a few inches in diameter. These patches often appear sunken and may expand up to a foot or more in diameter. Often times, more tolerant species of grass such as annual bluegrass or weeds will repopulate the center of the patch producing a frog-eye pattern. Patches increase in size over consecutive years and may reach several feet in diameter. Typical symptoms of the disease are circular patches; however, affected regions will sometimes be irregular in shape and often conform to the shape of low, wet areas or areas with poor drainage (Figure 2). Symptoms of take-all patch are usually not noticed until the warmer and drier weather of late spring and summer. At this time, affected bentgrass plants wilt and turn bronze to brown in color because of the inability of their damaged root systems to translocate water and nutrients. These plants are easily pulled free from the soil. Unfortunately, by the time symptoms of the disease are evident in summer, the pathogen is usually no longer active (soil temperatures of 70°F or higher), and fungicide treatment will not be effective.

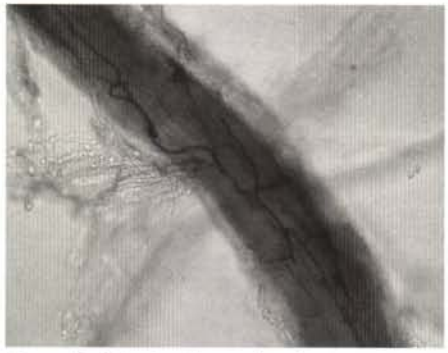

Figure 1. Colonized creeping bentgrass root with the characteristic dark brown runner hyphae.

Figure 2. Irregular pattern of take-all patch in an area of poor drainage. Note the weeds and annual bluegrass growing in the affected areas.

Effective management of take-all patch requires preventive measures. Cultural techniques that promote root growth such as proper irrigation, topdressing, and core aerification help reduced the severity of disease. Alteration of the root zone pH so that it is between 5.5 and 6.5 is also key in areas where the soil is alkaline. This can be achieved by using ammonium based fertilizers such as ammonium sulfate and ammonium chloride that are acidic. Products such as sulfur or spray tank acidifiers can also be used to modify the pH of the root zone (Dernoeden, 1987). Fertilization should be balanced as phosphorus and potassium are needed for healthy root growth and are essential in the recovery of damaged root systems. Preventive fungicide applications for take-all patch can be applied in the fall when the soil temperature of the root zone drops below 70°F and in the spring when the root zone temperature reaches 50°F. The fungicides should be drenched in with 1/4 to 1/2 inch of water to reach the root zone (Couch 1995). Fungicides recommended for the control of take-all patch include azoxystrobin (Heritage®) and triadimefon (Bayleton®).

What do you do if you do not see damage from take-all patch until the heat of the summer, and your plants are starting to wilt? As mentioned above, once the soil temperature nears 70°F, the fungus is no longer active, and fungicide applications will not be effective. If you are in this situation, the best thing that you can do is to maintain a balanced fertilizer regime, adequate soil moisture and syringe the plants regularly. Recovery from this disease is very slow, and hopefully these tips will help your greens make it through the heat of summer. Due to the similarities of the symptoms of take-all patch to other summer patch diseases, an accurate diagnosis is recommended for successful control of the disease. Diagnosis using a microscope is the best way to verify the presence of the pathogen.

If you have any questions about take-all patch or any other disease related problems, please do not hesitate to call or submit a sample to the Turfgrass Diagnostic Lab.

Literature Cited

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