

Soilborne spring diseases of roots, rhizomes, and crowns**May 4, 2017**

Of all turf problems, those that microscopically affect belowground plant parts are most difficult for turf managers to diagnose and treat. Weeds and signs/symptoms of foliar disease (e.g. powdery mildew, dollar spot, *Drechslera* leaf spot, yellow patch, etc.) are often readily visible and at least somewhat distinct with close inspection. Diseases of soilborne fungi (fairy ring, take-all patch, necrotic ring spot, summer patch, etc.), however, are more difficult to identify and treat for two reasons. First, root infection and decline takes place long before foliar symptoms of root decline are readily visible. When foliar symptoms appear, it's too late to prevent serious damage. Second, it can be difficult to treat roots with fungicide, even preventively, since higher spray volumes and post-application irrigation are necessary. Integrated strategies are therefore very important for these troublesome diseases. Further, proper timing of fungicide applications is vitally important, and soil temperature thresholds commonly "set the bar" for treatment. Recent rains and warming soils will likely result in active disease development.

Fairy rings. Fungi that decompose organic matter cause fairy rings in any turfgrass species. The process releases nitrogen and other substances that may accumulate at levels toxic to turfgrass roots, or in a way that causes soil particles to repel water. In most cases, fairy rings are simply darker green than surrounding turf and light rates of nitrogen fertilizer can mask symptoms. In areas where this strategy is insufficient, or where necrotic rings of turf develop, cultural practices that increase water and gas exchange in soils are important. In highly valued turf, applications of fungicides labeled for fairy ring may prevent symptoms if first applied when soil temperatures average 55°F over five days. The addition of a soil surfactant will likely increase the efficacy of this strategy.



Figure 1. A large fairy ring on a perennial ryegrass golf course fairway.

Take-all patch. Take-all patch most commonly affects young creeping bentgrass turfs (<10 years old), especially new or newly renovated stands that have been fumigated. Roots are infected during moist conditions in spring when soil temperatures are 50-65°F. Stressful summer conditions (heat, drought, etc.) following infection increase foliar symptom expression because weakened roots insufficiently support growth. For this reason, lingering symptoms are less likely in deeply rooted stands, but may persist throughout summer in poorly rooted areas. Acidifying fertilizers may reduce symptoms if applied when the pathogen is active. Fungicide applications are also most effective during cool soil temperatures in spring. Check fungicide labels for application instructions – high spray volumes (4 gal/1,000 ft²) are often recommended.

Necrotic ring spot. The necrotic ring spot pathogen infects Kentucky bluegrass and annual bluegrass roots during cool spring temperatures (60-75°F). Symptoms may be evident at this time, but more commonly appear when conditions become warm and dry. Root colonization may again occur with foliar symptom expression in cool fall months. Avoid cultivation and nitrogen fertilizer applications (especially with soluble sources) when the pathogen is active. If damage is intolerable, preventive fungicide applications beginning when soil temperatures average 60-75°F are effective. However, if left untreated for several years, necrotic ring spot incidence will naturally decline.

Summer patch. Kentucky bluegrass and annual bluegrass are most commonly affected. Similar to necrotic ring spot, the pathogen that causes summer patch begins colonizing turfgrass roots in spring, but foliar symptoms are not common until warm and dry conditions in summer. However, summer patch is different from necrotic ring spot because roots are commonly infected when soil temperature reaches 65°F and continues >75°F. The pathogen may be active all summer. Judicious fertilizer and irrigation management may reduce symptoms during summer. Acidifying nitrogen fertilizers have also been shown to reduce disease severity if pH is reduced <6.5. If needed, fungicides should be applied when the pathogen is active (when soil temperature reaches 65°F).



Figure 2. Summer patch symptoms on Kentucky bluegrass (Photo credit: Ward Upham, Kansas State University, Bugwood.org).

Drechslera. The pathogen that causes leaf spot of cool-season grasses during cool spring temperatures may also cause root, rhizome, and crown rots that lead to eventual melting out symptoms. Avoid surface moisture, excessive fertilizer applications during spring, and apply fungicides preventively if damage is intolerable.

Bottom line. Depending on the soilborne disease, fungicide applications should begin when average soil temperature is 50-65°F. Especially with recent rain, conditions are ideal for take-all patch development in SE Nebraska. Fairy ring applications could have begun in mid-April, and, after the cool-down last week, soils are rewarming to the 55°F mark. If applications weren't made, hold off until 55°F. Hold off for necrotic ring spot or summer patch applications.

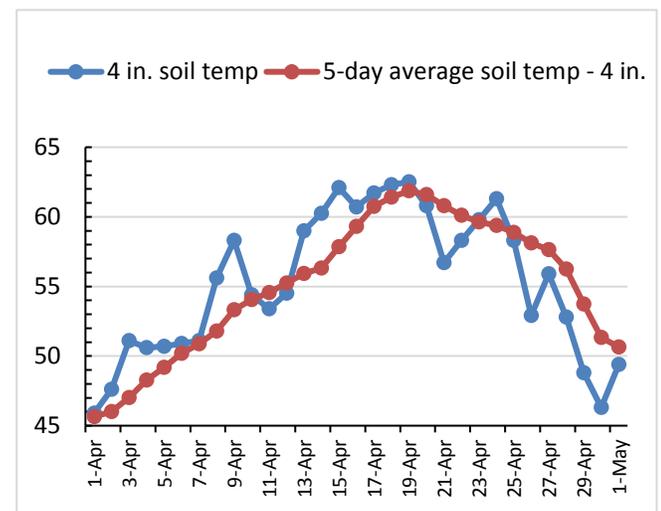


Figure 3. Recent daily and 5-day average soil temperature (°F) 4 in. below bare ground in Lincoln, NE.

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