

Utilizing Proper Cultural Practices to Reduce Turfgrass Diseases by Bruce Clarke¹

Most turfgrass diseases are caused by fungi that are dramatically affected by changes in the environment. This may include natural changes in temperature, moisture, and relative humidity as well as alterations in the environment caused by cultural management practices. Although we can do little to change the weather, turf managers can and should attempt to modify those management practices that affect the incidence and severity of major turfgrass diseases. Virtually everything a turf manager does can affect disease development. Some management practices may intensify turfgrass diseases while others may reduce symptom expression. It is the responsibility of every person who manages turf to accentuate the positive attributes of proper management and to limit those practices that enhance turfgrass diseases.

Nitrogen Fertility Management

Nitrogen, more than any other element, can influence the incidence and severity of turfgrass diseases. Many diseases, such as Gray leaf spot, *Cercospora* leaf spot, brown patch, pink snow mold / *Fusarium* patch, *Drechslera* leaf spot and melting-out and pythium blight, are readily enhanced by the application of quick-release nitrogen fertilizers when they are active. Other diseases, such as red thread, rust, and anthracnose, are frequently suppressed by small applications of nitrogen. Even dollar spot, one of the most widespread diseases of turf, is dramatically affected by nitrogen applications. When dollar spot is active, nitrogen may actually enhance disease development. However, when the disease is in remission, light applications of nitrogen can stimulate the recovery of infected turf.

Quite often, careful selection of the nitrogen source can help reduce symptom severity. For example, *Drechslera* leaf spot and melting-out can be intensified by spring applications of quick-release nitrogen sources such as ammonium nitrate or urea. However, the use of slow-release products like sulfur-coated urea or IBDU can reduce the melting-out phase of this disease. Research at Rutgers University has also clearly shown that the selection of the nitrogen source is critical to the successful management of summer patch.

Summer patch is caused by the root and crown infecting fungus *Magnaporthe poae*. This pathogen is greatly stimulated by high soil pH. As a result, the application of acidifying fertilizers (i.e., ammonium sulfate and sulfur-coated urea) over several years can reduce patch development 30 to 40% even without the use of fungicides. On the other hand, the use of nitrate-based fertilizers can actually stimulate patch severity by elevating soil pH over time. This relationship has also been observed with other diseases such as take-all patch and pink snow mold. In general, a good target pH for the management of these diseases is 6.0 since the causal agents are stimulated above a soil pH of 6.5.

Compaction/Aerification

Most stress related diseases are intensified by compaction. Soil compaction reduces rooting depth, plant vigor, and water infiltration. Unless alleviated, compaction may favor the development of many diseases such as summer patch, take-all patch, pythium root rot, rust, dollar spot, and anthracnose basal rot. Turf management practices that reduce compaction will, over time, reduce the severity of these diseases. The use of shallow (3.25 in) and deep (7 in) tine aerification has been used to reduce the diameter of summer

patch loci 70 to 80% over a three year period. This research has also indicated that spring aerification is often more effective than fall aerification in reducing disease severity. Aerification, however, should not be initiated when the target disease is active.

Thatch and Disease

Most foliar diseases are enhanced by a thick (>0.75 inch) thatch layer. Dollar spot, pink snow mold, *Drechslera* leaf spot and melting-out, yellow patch, dollar spot, pythium blight, brown patch, gray snow mold, and southern blight are all examples of diseases that are more severe when the thatch layer becomes excessive. Thatch acts as a sponge for water and nutrients and is a protection zone for turfgrass pathogens. Maintaining the thatch layer below 0.75 inch will help reduce this protective cover thus reducing fungal populations and ultimately disease intensity.

Effect of Moisture on Turf Disease Development

There are two types of moisture that can affect turf disease development. Leaf moisture is required by most fungi to infect turfgrass foliage. Diseases such as brown patch, pythium blight, and dollar spot need extended periods (>10 consecutive hours) of leaf wetness to develop into epidemics. Reducing the period of time that turf foliage remains wet should be the goal of every turf manager. One of the best ways to do this is to avoid irrigating turf in the early evening (6 to 10 PM) or late morning (9 to 11 AM) hours. Since turf is often wet because of dew or guttation water from midnight to 9 AM, avoiding the early evening and late morning hours will limit the total leaf wetness period and help prevent many disease outbreaks.

Soil moisture is also an important factor in turf disease development. Many diseases such as dollar spot are actually enhanced by low soil moisture (dry soil) and abundant leaf wetness. Even pythium blight (foliar pythium) is more severe under conditions of low soil moisture and high leaf wetness. Other diseases, including brown patch and red thread are generally unaffected by soil moisture levels.

Mowing Height

Many diseases are more severe at lower mowing heights. Root diseases in particular are often enhanced when turf is maintained below the recommended height of cut for a particular grass species. For example, summer patch is much more serious on golf greens when turf is cut below 5/32 inch. Low mowing depletes carbohydrate reserves in the plant thus predisposing it to disease. However, a few diseases (i.e., gray leaf spot) are more serious at higher heights of cut. For these diseases, high humidity associated with higher cutting heights, may actually intensify disease severity. For best results, maintain turf at the recommended mowing height ▲.

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