

**DISEASE MANAGEMENT FOR ATHLETIC FIELDS:
A MICHIGAN PERSPECTIVE**

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With increasing playing pressure and raised expectations, athletic fields are becoming more susceptible to turfgrass pests. Conditions range from turf being grown on well-fertilized, irrigated, and modified high-sand root-zones to compacted mineral soils that may receive no maintenance other than occasional mowing. The vast majority of these fields are in wide open locations with good air movement and not shaded.

Most of these fields were seeded with mixtures that contained primarily Kentucky bluegrass. For instance, many athletic field mixes are made up of two to four Kentucky bluegrass cultivars that together comprise 85% by weight with the balance being one or two perennial ryegrasses. A typical overseeding includes some or all perennial ryegrass because of its rapid germination. Sodded installations have nearly always been 100% Kentucky bluegrass. Over time, the species and the number of plants of each that are present can change drastically depending upon how the field is used and managed. Two important factors are the pounds of fertilizer applied, particularly nitrogen (N), and the amount and timing of rainfall and/or irrigation. These two factors coupled with the species composition have a great deal to do with what kinds of disease might be present from time to time, as well as severity of each.

Irrigated sports fields are often used extensively and the resulting soil compaction decreases water infiltration. In addition, severe divoting damage occurs especially with football and soccer. All in all, these conditions favor a proliferation of annual bluegrass, which is commonly referred to by its scientific name, *Poa annua*. Annual bluegrass is ubiquitous and over time will gain a foothold on all irrigated sports fields. The degree of infestation depends upon how the fields are managed. Even with the most judicious use of herbicides, annual bluegrass will spread if other pests are not well managed. When insects and disease thin irrigated turf stands, annual bluegrass will invade those bare spots. On non-irrigated sites, adventitious weeds include knotweed, broadleaved plantain, crabgrass, and goosegrass.

For the three turf species discussed so far, Table 1 shows the susceptibility and relative importance of most turf diseases for Michigan sports turf managers. Two upper case Xs denote that the disease should be of major concern, one upper case X means that the disease can be a problem, and a lower case x indicates minor importance.

Table 1. Disease susceptibility and relative importance by species on Michigan athletic fields.

	<i>Kentucky bluegrass</i>	<i>Perennial ryegrass</i>	<i>Annual bluegrass</i>
<i>Typhula blight</i>	x	XX	X
<i>Microdochium patch</i>	X	XX	XX
<i>melting out</i>	XX		
<i>red thread</i>	x	XX	x
<i>dollar spot</i>	x	X	XX
<i>brown patch</i>	x	XX	X
<i>pythium blight</i>	x	XX	XX
<i>necrotic ring spot</i>	XX		X
<i>summer patch</i>	X		XX
<i>rusts</i>	x	X	X
<i>powdery mildew</i>	x		
<i>leaf spot</i>	x	x	x
<i>fading out</i>	x	x	x
<i>pink patch</i>	x	X	x
<i>fairy ring</i>	X	X	X
<i>stripe smut</i>	x		
<i>grey leaf spot</i>		XX	
<i>anthracnose</i>		X	XX
<i>brown blight</i>		X	

Perennial ryegrass and annual bluegrass are considered to be two of the most disease prone turfgrasses, and it is important to note the number of major diseases for each of them. Perennial ryegrass planted in pure stands usually fail in Michigan without massive fungicide applications. Likewise, areas heavily overseeded with just perennial ryegrass will be disease prone. In mixed stands with predominantly Kentucky bluegrass, the effects of diseases on perennial ryegrass are of less concern. Patches of annual bluegrass are very susceptible to disease. Diseases of this specie should not be viewed as weed control since more annual bluegrass will grow back where turf loss has occurred.

The health and vigor of Kentucky bluegrass is critical to good athletic fields in Michigan, and disease management should be an ongoing concern. A common mistake is to leave these diseases untreated because it is thought that the turf will eventually "grow out" of it. Unfortunately, what happens is that opportunistic weeds grow into it, as discussed above. Generally, managers devote a great deal of their efforts and resources toward the particular fields that are in season. For example, they are trying to make the football field look the best in the fall while forgetting about the baseball field until the next spring.

Kentucky bluegrass stands in Michigan can be thinned by melting out, necrotic ring spot, and pink snow mold, many of which can kill the crowns, resulting in permanent turf loss. Therefore, it is important to manage these major diseases so that the turf stand is dense, uniform, and healthy throughout the year. Brown patch, pythium blight and summer patch can be debilitating as well, but are not as prevalent on Kentucky bluegrass in Michigan as they are elsewhere. Proper fertilization and watering practices can reduce the severity of many diseases such as red thread, dollar spot, and rust. These diseases may look bad when they are active, but the turf usually recovers when growing conditions change. The other Kentucky bluegrass diseases listed in Table 1 are minor diseases that are not commonly encountered in Michigan.

The causal organism of melting out is *Drechslera poae*, and it is active during cool and wet periods primarily during the spring and also again in the fall. The disease causes black to purple spots on leaf blades. As the disease progresses, the turf turns off-color depending on the nitrogen available. Under low N the turf becomes yellow and under high N it appears blackish-brown. Advanced infections result in thinned, brown turf, which

can occur as soon as three weeks after initial infection.

Resistant cultivar selection is the main defense against melting out. Other cultural practices are late fall applications of nitrogen; light daily irrigation when needed; and light N applications during cool, wet seasons. It is also beneficial to raise mowing height during cool, wet seasons. Accordingly, one could raise the mowing height on the football field in the spring and on the baseball field in the fall. If one detects melting out, they should assume that a significant component of their turf is susceptible and consider making a fungicide treatment of chlorothalonil, iprodione, or vinclozolin.

Necrotic ring spot can be a devastating disease especially under drought and low-N conditions. Research at MSU has shown that the disease severity lessens with light daily watering and monthly applications of 1 lb N/ M during the growing season. The pathogen, *Leptosphaeria korrae*, is active in cool conditions during the spring and fall. It creates six-inch to two-foot sunken patches that make the turf not only unsightly but unlevel as well, a particular concern on playing fields. Infected leaves turn dark red in fall and appear wilted in late spring and early summer, even under well-watered conditions. Eventually the outer part of each patch has straw colored leaves with green leaves in the center. This frog-eye characteristic is most evident in late summer.

Resistant cultivars are available and should be planted if large infected areas need renovation. Fungicides at very high rates can be effective where adequate N is being applied. An expensive treatment of DMIs can be applied preventively, but it would make more sense to put that money toward increased fertilization and the maintenance of an effective irrigation system. A high rate of a benomyl or thiophanate methyl can have a curative effect if watered in immediately after application.

The draw back to maintaining high levels of nitrogen during the summer is that the turf becomes predisposed to brown patch. Fortunately, in Michigan it is not often severe on Kentucky bluegrass like it is on perennial ryegrass and tall fescue. However, if it does become a problem then chlorothalonil should be applied in order to preserve the stand vigor and density. Another summer disease that can warrant fungicide treatments is pythium blight, although its occurrence is relatively rare on Kentucky bluegrass unless the site is poorly drained.

Red thread can be troublesome during the cool, wet periods of the spring and fall especially if very much perennial ryegrass is present. This disease occurs on slow growing turf and can be regulated with light applications of quick-release N. Occasionally red thread persists even when N has been applied, especially if it is in a slow-release form. At any rate, changing weather conditions usually send the disease into remission and fungicide treatments are not normally needed. Rusts, which can sometimes be active in the fall, can also be managed with increased nitrogen.

Fall fertilization, especially during late September and October, is a common practice on fields in active use, such as football, soccer, and major league baseball. While this strategy helps turf recovery and management of most pests, it predisposes the turf to *Typhula* blight and *Microdochium* patch, which are the proper names for gray and pink snow mold, respectively. This occurs because turf that is actively growing during the fall is lush and does not harden off with cooler temperatures as does turf that is fertilized only in early September and early November, the typically recommended fertilization times for mid Michigan. When the turf is pushed with N throughout the fall, snow-mold fungicide applications should be considered especially if the field gets any play in the spring. A good example of this would be interscholastic soccer fields that are used by boys in the fall and girls in the spring.

Any number of fungicides alone or in combination will prevent snow mold if applied in late fall. Curative rates applied in the spring are usually much higher and therefore more expensive. The lowest cost alternative is PCNB, but the turf does suffer some off-color phytotoxicity that may last until the turf growth accelerates in the spring. While it is probably easier to make granular applications of snow-mold fungicides, research at MSU has shown greater efficacy when they are sprayed.

Typhula blight is caused by *Typhula incarnata* and/or *Typhula ishikariensis*. While it can cause damage to Kentucky bluegrass, it can be much more devastating to the other turf species found on athletic fields. The

disease is active under sustained snow cover and the symptoms appear after snow cover has melted (30 to 55°F). Small patches appear that are 3 inches to two feet in diameter. Microdochium patch, caused by *Microdochium nivale*, is more widespread and can occur anytime during cool and wet weather. The symptoms are 1 to 8 inch reddish-brown spots, which can be unsightly, especially in the opening days of baseball or softball season.

Another disease that may appear during late spring and then again during the summer is dollar spot. The pathogen *Sclerotinia homoeocarpa* causes small white patches that coalesce. The dollar spots are less distinct at higher heights of cut and Kentucky bluegrass is less susceptible than perennial ryegrass. Favorable weather conditions for its development are daytime temperatures between 60 and 75°F and in the 60s at night. High nighttime humidity that causes heavy dew formation and foggy mornings is an especially ripe condition for dollar spot. While this is an unsightly and often alarming disease, it is often not worth treating especially if the field is not being used in the summer. If it is, then fungicides may already be in place for protection from other diseases and they will usually suppress dollar spot below bothersome levels.

Fairy ring can be caused by several mushroom fungi. However, they should not be found often on an athletic field unless trees were cut down before the field was built. Buried stumps or logs can serve as an initial carbon source for the fungus' mycelial growth that radiates outward. The mycelia parasitize the turf and then the turf grows back greener than before. This makes a circular pattern in the turf, and each year the ring gets larger. The "fairy" part of the name comes from the fact that mushrooms can pop up overnight along the circle's diameter. Buried construction material may also be a culprit. No fungicide works well on fairy ring, but N fertilization can mask the symptoms. The only true solution is to fumigate the soil before turf reestablishment.

Other types of cool-season turfgrasses present their own set of disease problems. For instance, tall fescue is very susceptible to brown patch and snow mold. However, diseases are seldom treated on tall fescue athletic fields, since these sites are usually considered to be low maintenance, i.e., non irrigated and low fertility. On the other hand, *Poa supina*, would require intense management with regular irrigation during warm weather. Little information exists concerning diseases, but it probably succumbs to many of those that attack annual bluegrass.

Sports field managers should make sure that they know exactly what pathogen is doing the damage, especially before making any fungicide applications, which can be costly compared to other expenses. A good way to do this is to submit a sample to the MSU Plant and Pest Diagnostic Clinic (517-355-4536). As an MTF member, this costs just \$50, and you are contacted within a few days with diagnoses and recommendations. An excellent reference book and the source of much of the information presented here today is *Management of Turfgrass Diseases* by Dr. Joe Vargas.

Pest management is an important dimension of the overall maintenance of a top-flight athletic field. Light daily watering is preferable to deep and infrequent irrigation, especially on well-drained fields or during summer stress periods. Fertilization levels should be kept high with one-half to one pound of N per month as discussed earlier. Other critical components are mowing by 1/3 rule, whenever possible; regular aeration, two to three times a year; topdressing to maintain a level playing surface, as well as to limit thatch accumulation; and overseeding, particularly with pregerminated Kentucky bluegrass.