



Botany and



Plant Pathology

Summer Patch

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Summer patch affects Kentucky bluegrass and annual bluegrass on all kinds of turf venues, including golf courses, athletic fields, professional landscapes, and residential lawns. The summer patch pathogen, *Magnaporthe poae*, is active during late spring and summer when turfgrass root growth is diminished.

Summer patch can be particularly severe on golf greens containing moderate to high proportions of annual bluegrass. Turf killed in midsummer adversely affects playability and ruins turf's aesthetic appearance.

Summer patch symptoms begin to appear during the heat of summer because infection-impaired roots cannot keep plants alive during periods of heat and drought stress. Initial symptoms resemble small (4-6 inches in diameter) circular or oval patches that are orange-brown and often occur in clusters (Figure 1). Individual patches expand to more than 12 inches in diameter.

After initial disease establishment, patches enlarge in a radial fashion. Most turf damage occurs at the leading edge of the patch. Areas in the center of a patch may fill in with creeping bentgrass, particularly on golf greens (Figure 2), or other turf species in Kentucky bluegrass stands. On turf maintained at a cutting height of less than 2 inches, Kentucky bluegrass may eventually recolonize the center of dead patches.

In turf stands where the disease has been established for several years, the infected areas have field patterns that resemble frog-eye patches or arcs and rings of damaged turf (Figure 3). Plants with moderate to severe



Figure 1



Figure 2



Figure 3

infection will exhibit a characteristically sparse and necrotic root system (Figure 4).

Infection by the summer patch pathogen is highly dependent on the temperature and moisture status of the soil. Summer patch may infect and colonize turf roots when soil temperature exceeds 65°F. This root infection often occurs in spring before symptoms are observed. Patches appear later, during periods of heat and drought stress, when plants with even moderate levels of infection succumb to the disease.

The summer patch pathogen survives in infested turf debris and in infected root and crown tissues. While the pathogen naturally occurs in many types of soils, it also may be transported to unaffected areas with maintenance practices that involve moving soil with contaminated roots or root debris (primarily aeration).

Disease Control

Resistance to Disease

Some progress has been made in the development of Kentucky bluegrass varieties with moderate resistance to summer patch. A comprehensive list of Kentucky bluegrass varieties and their performance in a battery of trials is available on the National Turfgrass Evaluation Program (NTEP) website, www.ntep.org. Other cool-season turf species (such as perennial ryegrass and tall fescue) are not susceptible to summer patch.

Cultural Practices that Suppress the Disease

Because extensive summer patch outbreaks are associated with severe heat and drought stress during the summer, cultural practices that relieve such stresses will minimize disease damage.

Summer stress relieving practices include:

- Core aeration or deep tine aeration in the fall and spring. This promotes deep rooting, resulting in healthier turf that's less prone to infection and more tolerant of summer stresses despite mild, or even moderate levels of infection.
- Avoiding stress associated with nitrogen deficiency.
- Prolonged (deep) infrequent irrigation.
- Syringing to cool turf on hot afternoons.
- Redirecting traffic to minimize damage and compaction.

Chemical Control Options

Fungicides may be effective in reducing the severity of a summer patch outbreak. Only penetrant fungicides



Figure 4

are recommended since they seem to possess sufficient solubility to reach roots in thatch and perhaps the top few millimeters of soil.

Because these fungicides are expensive, several factors should be considered before implementing a chemical control program. Summer patch is a root disease and very little fungicide will find its way underground. Aeration (even solid tine) prior to spraying, and irrigation before and after application, may enhance fungicide performance by improving the likelihood that effective levels of fungicide will reach the target zone.

Also, initial application timing is critical. Fungicides must be applied when the pathogen is active — and soil temperatures define that activity. A general rule of thumb advises fungicide application only after maximum daily soil temperatures at a 3-inch depth average 65°F or higher for several consecutive days. Fungicide sprays targeted for summer patch will be ineffective if applied before the 65°F threshold is reached.

Several applications at 28-day intervals are normally recommended for summer patch control. Sprays applied after symptoms occur will have very limited effects. Applicators must exercise caution in selecting fungicides for summer patch control because repeated use of the same class of fungicides for this disease will inadvertently

lead to selection of fungicide-resistant strains of pathogens of other diseases such as anthracnose and dollar spot.

Relying solely on fungicides for summer patch control is always expensive and results often are inconsistent. Fungicide performance will be greatly improved with attention to cultural practices and use of less susceptible turfgrass varieties.

Residential Lawn Help

Managing summer patch in residential lawns is similar to the approach taken by professional turf managers. Outbreaks can be avoided by using resistant varieties of Kentucky bluegrass, and an outbreak's severity can be lessened with cultural practices that promote healthy roots. Core aeration in the spring or fall encourages deep rooting, improving the chance of turfgrass survival and recovery.

Irrigating properly, implementing an adequate nitrogen fertilizer program, and keeping mowing heights to 3 inches will reduce demands on the root system and diminish the likelihood of turf decline during hot, dry conditions. During periods of peak symptom expression, applying supplemental nitrogen fertilizer (0.1-0.2 pounds per 1,000 square feet) will mask the effects of the disease. Consider fungicide application only if other options have been thoroughly exhausted, and then should be contracted through custom spray applicators.

Other publications in the *Turfgrass Disease Profiles* series are available from the Purdue Extension Education Store (www.edustore.purdue.edu) and Purdue Botany and Plant Pathology (ag.purdue.edu/btny/Lists/Publications/Diseases_of_Turf.aspx).

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