



Management and Control of Summer Patch (*Magnaporthe poae*)

Ectotrophic root infecting (ERI) fungi are one of the most destructive classes of turfgrass diseases. Summer patch (*Magnaporthe poae*) and necrotic ring spot (*Leptosphaeria korrae*) are the most common ERI fungi to affect Iowa turfgrass. Summer patch (SP) and necrotic ring spot (NRS) are caused by Ascomycetes. Ascomycetes is made up of more than 30,000 species ranging from one-celled yeasts to fairly large morels, as well as some of the common black molds and powdery mildews. A majority of these species are very beneficial to the ecosystem; however a few are disease-promoting organisms.

Spring dead spot, dead spot (bentgrass), and take-all patch also fall into the Ascomycetes fungi category.

Disease Management Steps

The first step in ERI control is to correctly identify the disease. It is important to accurately diagnose diseases due to the cost associated with incorrect diagnoses and potential for further turf damage. In addition, newer generation fungicides only control a small group of specific diseases.

To identify a disease, start with a simple list of the possibilities based on the turf species and the time of year. Through a process of elimination, narrow the list by writing down symptoms and signs. Symptoms are visible damage or how the disease is expressed on the host, a sheath lesion for example. Signs (mycelium, hyphae, spores) are the visual expressions of disease by the organism. If a correct diagnosis is not readily apparent, send a sample to a diagnostic lab such as the [Plant and Insect Diagnostic Clinic](#) at Iowa State University.

Diseases are grouped as abiotic (physical stress not derived from living organisms) and biotic (biological stress caused

by living organisms). Abiotic diseases that affect turf are nutritional deficiencies or toxicities of heavy metals in the soil, drought and heat stress, air or soil pollution, winterkill, and pesticide damage or phytotoxicity. Biotic factors caused by living organism can be bacteria, viruses, nematodes, parasitoids, and fungi. Fungi are plant-like organisms that do not produce true seeds, lack roots, stems, leaves, and chlorophyll. A majority of fungi are beneficial thatch decomposers in the soil and do not cause injury to turfgrass or other crops. However, like summer patch and necrotic ring spot, most of the turfgrass diseases are attributed to fungi.

Ecology

Disease symptoms cannot always be distinguished in the field, even to the trained eye. Summer patch and necrotic ring spot produce identical symptoms on bluegrasses and fine fescue. A majority of the ERI damage in Iowa is noticed on Kentucky bluegrass or annual bluegrass dominated turf. Both diseases are known as a “frog-eyed” diseases because they produce 6-12 in. semicircle frog-eye spots. Sometimes arcs or patches can be seen. In mixed stands of grass, the pattern of symptoms is much more irregular. The best way to identify ERI fungi is the sparse, dark colored runner hyphae on the outer surface of the roots (Figure 1). The infected roots are unable to supply adequate water to the turf causing the appearance of moisture stress.

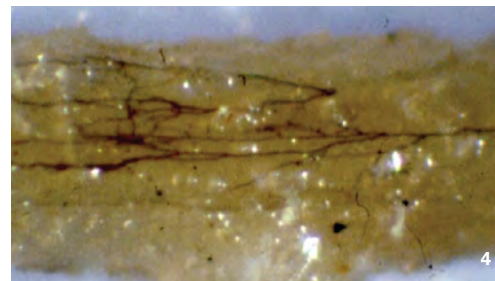


Figure 1. Dark colored runner hyphae

The biggest difference between SP and NRS is its frequency. Summer patch is seen more frequently in Iowa than NRS. Summer patch also occurs between June and September, while NRS damage commonly occurs between March and June, as well as later in the year between October and December. Even this difference is sometimes hard to distinguish in certain years. Adequate spring rainfall can mask NRS damage well into June or July. The damage only becomes existent during hot, dry periods leading to a false diagnosis.

Summer Patch primarily affects Kentucky bluegrass in Iowa and across the transition zone that runs across the entire central United States from North Carolina to California. Symptoms of summer patch can be easily confused with leaf and sheath spot, insect damage from grubs, or drought stress. These possible causes need to be eliminated before a diagnosis of summer patch is made.

Dull red, tan, or straw-colored tissue in a frog-eye pattern is the first visible symptom of summer patch. Further observation of the roots, rhizomes, and crowns yields dark brown to black roots. Summer patch survives the winter as mycelium and begins colonizing roots when temperatures reach 68-90°F. The fungi spreads along roots and rhizomes from plant to plant. Ectotrophic root damage is often large because it can spread long distances through aeration and infected sod. Often recovery has been slow because new roots are inhibited by high soil temperatures. The risk factors that attribute to the ecology of SP are hot, wet weather, compaction, high pH soils, low mowing heights, south facing slopes, and the use of soluble fertilizers. Summer patch is most severe in 2-5 year old turf established from sod. Severity can also increase when “muck soil sod” – soil with a very high clay content from Minnesota and Wisconsin – is placed on native Iowa soil.

Necrotic ring spot causes symptoms in the spring and fall and begin colonizing roots when temperatures are between 50-85°F. Cool, wet weather favors NRS. Drought stress can also predispose attack during the summer. Like summer patch, compaction favors the disease. Dull red tinted to straw-colored tissue in a frog-eye pattern is most commonly observed. Small pear-shaped fruiting bodies may be present on the decaying roots. NRS is often most severe on 4-5 year old turf established by seed.



Extensive summer patch damage

Fungicide Control

There are several curative and preventative fungicides labeled for summer patch control. Applications need to begin early in the spring when soil temperatures reach 64°F. Application should be repeated 2-3 times on 21-28 day intervals through mid-August. Once symptoms of SP appear, it is too late for fungicides; curative fungicides have proven to be inconsistent but cultural controls are the most effective option. Summer patch research has observed the best control using combination products containing demethylation inhibiting fungicides (DMI's) and strobilurins. Disarm™, Headway™, and Armada™ are three of the chemicals that fall into this category. Other products such as fluxapyroxad, propiconazole, myclobutanil, thiophanate-methyl, trifloxystrobin, and triadimefon are also labeled for summer patch control.

Necrotic ring spot control is very similar to summer patch. Applications need to begin early in the spring when soil temperatures reach 55°F. Application should be repeated 2-3 times on 21-28 day intervals. Once symptoms of NRS appear, it is too late for fungicides; curative fungicides have proven to be inconsistent but cultural controls are the most effective option. Necrotic ring spot research has determined DMI products provide the best control. Eagle™, Rubigan™, Banner Maxx™ and Torque™, are a few of the chemicals that fall into this category. Other products containing thiophanate-methyl, azoxystrobin, and iprodione are also labeled for necrotic ring spot control. It is important to remember that DMI's should not be applied with certain plant growth regulators during the summer. This combination often leads to other issues such as algae development.

Cultural Practices

When summer patch or necrotic ring spot symptoms appear, cultural control methods are the most cost effective. Foliar spoon-feed applications of ammonium sulfate at 0.1-0.3 pounds/N/1,000 square feet can briefly reduce severity. If foliar feeding is not an option, use slow release products rather than high rate applications of soluble nitrogen fertilizers. An annual spring application of magnesium sulfate may also help reduce SP and NRS issues. In addition, raising the mowing height during high stress periods will help reduce disease pressure.

Both diseases are prevalent in compacted soils, so improving internal drainage through core aeration and deep-tine aeration will help a great deal. If summer patch or necrotic ring spot is an annual problem, consider overseeding resistant varieties. The older varieties of Kentucky bluegrass, including Adelphi, Challenge, Eclipse, and Nuglade are moderately resistant to both diseases. If battling summer patch exclusively, Barvette, Nuglade, Midnight, Impact, and Sky are less susceptible Kentucky bluegrass varieties.

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