

"It's usually not recognized that for every injurious or parasitic microbe there are dozens of beneficial ones."

— Selman Waksman, "Father of Antibiotics,"

Nobel Laureate

Plant disease clinics are especially popular from now through early autumn. Stressful turfgrass conditions lead to numerous maladies, many of which are sent to plant disease clinics. One diagnosis that causes some confusion, at least to me, is the occurrence of ectotrophic root-infecting (ERI) fungi. These fungi are often associated with root-rotting diseases that produce patch-like symptoms.

Diseases associated with the term ERI include take-all patch, spring dead spot, summer patch, dead spot, necrotic ring spot and root decline of warm-season turfgrasses (bermudagrass decline). The pathogens of these diseases infect turfgrass roots through mycelia called ectotrophic runner hyphae. Ectotrophic refers to fungi that produce on the outside or external to the root, and runner hyphae is thickened hyphal strands. Originally, ectotrophic runner hyphae were associated with take-all patch caused by the pathogen *Gaeumannomyces graminis* var. *avenae*. Eventually, other pathogens that infected roots were identified and found to produce the *Gaeumannomyces* type runner hyphae.

The runner hyphae association with *Gaeumannomyces* has led to confusion among superintendents who think they have take-all patch. The problem with the ERI fungi is that they are difficult to identify. To culture these pathogens for positive species identification is arduous and time consuming. Most of us can't wait during the heat of summer for a conclusive positive identification that can take several weeks or months. Thus the association among

Clinics Make for Money Well Spent

BY KARL DANNEBERGER



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symptoms, the host and the sign of ectotrophic runner hyphae provide in most cases a pretty good diagnosis of the problem.

However, the presence of ERI runner hyphae might not be the sign of the real malady. For example, a creeping bentgrass turf that is suffering from pythium root-dysfunction may have runner hyphae present on the diseased root system during summer stress months. The actual diagnostic sign of pythium root-dysfunction — oospores — are present in the spring or fall on the root system. If you were to go on the presence of runner hyphae as the diagnostic key, at least in this case, you would be mistaken.

This is now a logical lead into the optimum time for targeting control measures toward these root-infecting diseases. The infection of roots by ERI fungi normally begins weeks or months before symptom expression. Once symptoms appear, control is often difficult. With the ERI-causing diseases, preventative measures should be targeted at or just prior to root infection.

Finally, as turfgrasses are maintained under increasing management and environmental stresses, new and ever-increasing turf maladies are becoming more difficult to identify. Plant disease clinics and laboratories are here to help you identify a problem or confirm your suspicions.

Use these clinics. It is money well spent.

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Table 1: Turfgrass diseases associated with ectotrophic root-infecting fungi

Disease	Pathogen	Primary Hosts
Take-all patch	<i>Gaeumannomyces graminis</i> var. <i>avenae</i>	Creeping bentgrass
Root decline of warm-season turfgrasses	<i>Gaeumannomyces graminis</i> var. <i>graminis</i>	Bermudagrass, warm-season turf
Summer patch	<i>Magnaporthe poae</i>	Kentucky bluegrass, <i>Poa annua</i>
Necrotic ring spot	<i>Ophiosphaerella korrea</i>	Kentucky bluegrass, <i>Poa annua</i>
Dead spot	<i>Ophiosphaerella agrostis</i>	Creeping bentgrass
Spring dead spot	<i>Leptosphaeria narmari</i>	Bermudagrass