***Pythium* root diseases**
June 8, 2017

***Pythium* foliar blight** typically occurs under high humidity when daytime high temperatures are > 90˚F and nighttime lows are > 70˚F. Infections are easily spotted under these conditions because of the water-soaked appearance of leaves and abundant aerial mycelium. All cool-season species are susceptible to *Pythium* blight. Brown patch also produces aerial mycelium, and occurs under similar conditions as *Pythium* blight. The 10-day forecast shows perfect weather for the development of both diseases. If damage is intolerable, ensure your turf is protected. Many fungicides are available for brown patch control, but strobilurins (e.g. azoxystrobin), flutolanil, polyoxin D, and demethylation inhibitors (e.g. propiconazole) are most effective. Azoxystrobin, cyazofamid, fosetyl-Al, mefenoxam, or propamocarb are most efficacious for *Pythium* blight, and work best preventively. Populations of *Pythium* species resistant to azoxystrobin, mefenoxam, or propamocarb have been reported in turf or other crops. Cyazofamid is likely the most effective curative product.

***Pythium* root diseases** common to sand-based rootzones (root/crown rot or root dysfunction) are perhaps not as well understood as *Pythium* blight, but we do know that infection occurs at cooler temperatures than foliar blight. Some species that cause root diseases grow most rapidly when temperatures are as low as 54˚F, whereas others are more aggressive at warmer temperatures. While appropriate temperatures are important for disease development, overly wet soils appear to be the single most important factor for root infection by *Pythium* species. As a result, cultural practices that improve surface drainage and limit overly wet soils (regular cultivation, sand topdressing, and judicious irrigation) will increase the resiliency of turf, and potential reduce disease severity. *Pythium* root infections are more difficult to diagnose without laboratory inspection, but general turf decline is an early symptom. Turf may appear stunted, yellow to brown, lose density, and could be unresponsive to fertilizer applications. *Pythium* root and crown rot causes root and crown discoloration, and reduced overall rooting and root hair production. Turf affected by *Pythium* root dysfunction may have white, apparently healthy roots – close inspection reveals few root hairs and oospores in infected roots (Figure 1). We've already diagnosed *Pythium* root diseases this year, and reports of likely cases continue to come in.

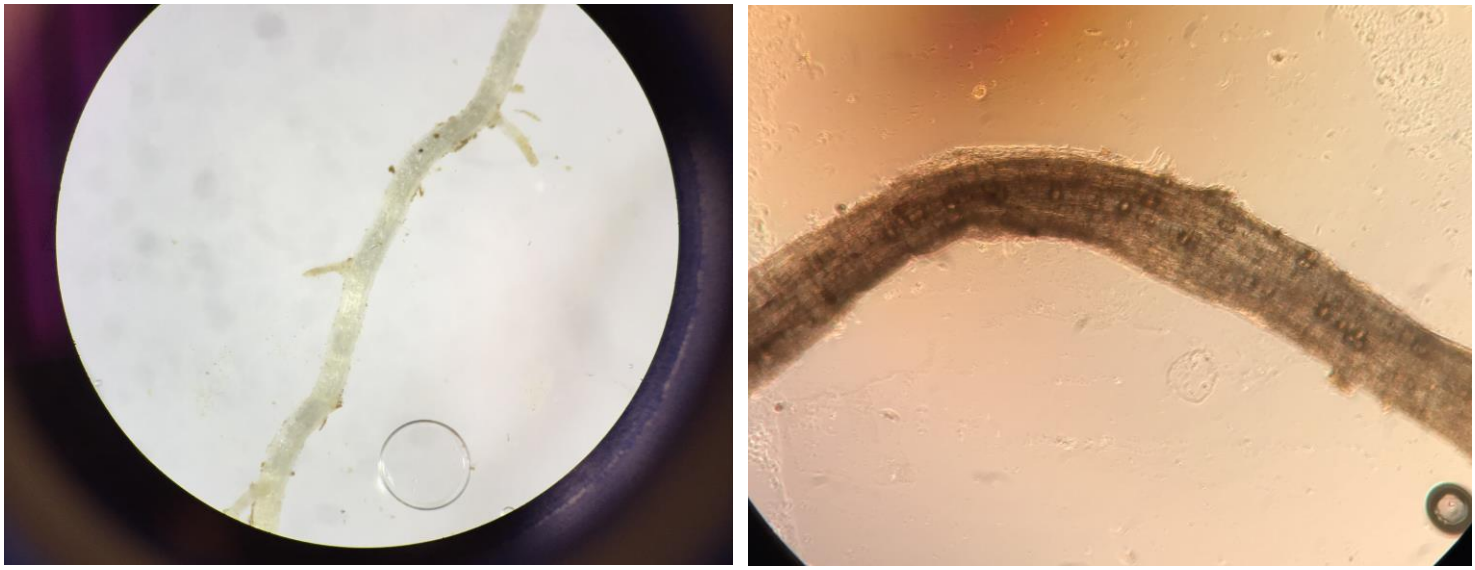

Figure 1. A creeping bentgrass root with few root hairs (*left*) and *Pythium* oospores in a creeping bentgrass root (*right*).

Cyazofamid and pyraclostrobin are most efficacious for *Pythium* root diseases, and should be sprayed in 4 to 6 gallons of water per 1,000 sq. ft. Fosetyl-Al (and other phosphite products) provide reasonable control under low disease pressure, but should be mixed or rotated with other products for maximum efficacy. These products are truly systemic, and should be applied to foliage in 1 to 5 gallons of water per 1,000 sq. ft. Allow phosphites to dry on leaves after application, but irrigation should follow whenever tank-mixed with other products. In sites with a history of infection, preventive applications should begin when soil temperatures are 54-75˚F at a two inch depth. Researchers at North Carolina State University are extensively studying *Pythium* root diseases, and recommend a rotation of pyraclostrobin, cyazofamid, fosetyl-Al + propamocarb, and fosetyl-Al + mefenoxam every 21-28 days if applied preventively (the interval should be reduced to every 14-28 days if applied curatively).

We are initiating research to better understand *Pythium* species causing root diseases in Nebraska, and have active fungicide efficacy and cultural management studies on campus that will be discussed at field day on July 12. Part of our research involves sampling suspected *Pythium* root infections across the state to determine the population structure of causal species. **If you suspect an infection, please email us at either address below for instructions on where to send a sample**.

Bottom line. Upcoming weather is likely to result in the development of *Pythium* foliar blight and brown patch in cool-season turfs – select an appropriate fungicide and protect high-value turf. *Pythium* root diseases are active in Nebraska, and can be difficult to diagnose. Appropriate fungicides will provide preventive or curative control.

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