Golfdom'S PRACTICAL RESEARCH DIGEST FOR TURF MANAGERS

TURFGRASS TRENDS

RAPID BLIGHT

Timely Fungicide Applications, Salinity Reduction Help Control Rapid Blight

By Mary W. Olsen

Rapid blight is a relatively new turfgrass disease (Stowell et al., 2005). It was first described in 1995 when microscopic football-shaped structures were routinely observed within leaf cells in symptomatic cool-season turfgrasses, but their identity and relevance to disease remained a mystery for several years.

The causal organism, *Labyrinthula terrestris*, was identified in 2003 (Olsen et al., 2003). Rapid blight occurs on golf courses, commercial lawns and sports turf that use irrigation water with moderate to high salinity. Generally, it appears on cool-season turfgrasses irrigated with water at electrical conductivity greater than 2 deci-Siemens per meter (EC >2.0 dS/m) over 1,300 total dissolved salts (TDS). It is most severe on rough and annual bluegrasses, perennial ryegrasses, and colonial and velvet bentgrasses. Early symptoms of disease include patches of turf that appear water soaked and slightly sunken. Infected patches in *Poa trivialis* are first appear orange to golden (Photo 1), and large areas of straw-colored dead turf develop quickly in bentgrasses (Photo 2, p. 48).

PHOTO 1

A common symptom of rapid blight in rough bluegrass (Poa trivialis) is the development of orange- to gold-colored sunken patches of turfgrass.

Characteristics of the pathogen

Understanding the nature of the pathogen that causes rapid blight is the first major step in developing control measures.

Early attempts to identify the pathogen led to the disease mistakenly being associated with a chytrid fungus. However, *Labyrinthula terrestris* belongs to a unique group that is not a

Continued on page 48

IN THIS ISSUE

Biofuels, Part One
Visit our archives at www.turfgrasstrends.com for a recipe for homemade biodiesel.

Continued from page 47

fungus, oomycete or a bacterium. It is difficult to place it neatly among other turfgrass pathogens. *Labyrinthula* species are often referred to as marine net slime molds, but they are not related to true slime molds at all. Their most prominent features are the microscopic football-shaped vegetative cells and networks of tubes in which the cells "glide." *Labyrinthula* cells can move more than 0.5 inches per hour in lab cultures and are found on all plant parts.

Until identified as a pathogen of turfgrass, *Labyrinthula* species were thought to be associated only with marine systems, but *L. terrestris* grows best in culture at salt-adjusted salinity of 2.0 dS/m to 10.0 dS/m.

Long-term survival mechanisms of *L. terrestris* are not well known. It survives over the summer in the absence of its cool-season turfgrass hosts either on dry plant tissue or non-symptomatic warm season turfgrasses. In Arizona, *L. terrestris* has been isolated from non-symptomatic bermudagrasses and non-symptomatic *Poa trivialis* irrigated with recycled water (EC 0.8 dS/m) indicating that it probably has a wide distribution but causes disease only under certain conditions. Genetic studies indicate that *Labyrinthula terrestris* may have originated from a marine species (Craven et al., 2005), but the rapidity with which it apparently spread is still a mystery.

Labyrinthula terrestris and rapid blight disease

Diseased turf is frequently associated with suboptimal irrigation water. Incidence varies, but disease severity increases as salinity of irrigation water increases above 1.5 dS/m (about 1,000 ppm).

In our greenhouse experiments at the University of Arizona, inoculated perennial ryegrass irrigated at EC 0.5 dS/m to 1.0 dS/m never developed symptoms, but *L. terrestris* was re-isolated from plants. Increased salinity (EC 1.5 dS/m to 8.0 dS/m) was directly correlated to increased disease severity. Soil salinity also is a factor, and when elevated because of incomplete leaching and/or depleted soil moisture, rapid blight may appear when salinity of irrigation water seemingly is not a problem. In either case, disease disappears after substantial rainfall.

Non-symptomatic warm-season turfgrasses such as bermudagrasses are reservoirs of *L. terrestris* that infects susceptible cool-season turfgrasses after overseeding. Susceptibility of cool-season varieties varies, and more salt-tolerant varieties are often more tolerant to rapid blight (Camberato, et al., 2006). In field trials in Arizona (Kopec et al., 2004), several varieties of creeping bentgrasses and red fescues were very tolerant to rapid blight. Most perennial rye varieties tested to date show moderate to low tolerance, and all varieties of velvet

PHOTO 2

In susceptible bentgrasses, large areas of straw-colored dying turfgrass develop quickly, often in discrete areas with both heavy traffic and elevated salinity.

bentgrass, colonial bent and rough bluegrass tested have been very susceptible.

Disease control

Control of rapid blight depends on the integration of cultural practices that reduce salinity in irrigation water and soil, use of tolerant varieties and timely fungicide applications.

Where disease occurs in cool-season grasses used for overseeding, choices in overseeding protocol are critical. In severe situations, the choice is whether to overseed at all if salinity of irrigation water or soil salinity cannot be alleviated adequately. In more moderate situations where disease is manageable, tolerant turfgrass varieties should be used for overseeding (Photo 3). Using tolerant varieties for overseeding can reduce the need for salinity remediation and also decrease dependence on fungicides.

In areas where susceptible perennial turfgrasses such as *Poa annua* or colonial/velvet bentgrasses are used, cultural practices that reduce salinity, specifically sodium chloride, must be used in conjunction with fungicide applications.

The only highly effective fungicide for rapid blight control is pyraclostrobin. Other fungicides with moderate efficacy are trifloxystrobin and mancozeb. Because of the repeated use of the strobilurin fungicides, pyraclostrobin and trifloxystrobin, it is highly recommended that they be tank mixed with mancozeb to help prevent development of fungicide resistance. At this time, fungicide resistance has not been detected.

Under severe salinity conditions, rapid blight is very difficult to control with any combination of fungicides, and aggressive cultural practices to reduce salinity must be employed as well. Early disease diagnosis is critical for control since effective fungicides are so limited.

PHOTO 3

Differences in tolerance to rapid blight are demonstrated on a putting green that was overseeded on one side with Laser Poa trivialis and was severely affected by rapid blight and on the other side with Seaside II bentgrass that never developed symptoms.

Current conclusions

It is likely that *Labyrinthula terrestris* is well established in turfgrasses but has been overlooked, probably because of difficulty in isolating it and the similarity of rapid blight to other diseases such as salt damage and *Pythium* blight.

The increase in rapid blight coincides with increases in turf acreage, increased use of relatively high salinity water or recycled water for irrigation, and increased frequency of mowing combined with decreased mowing heights. It is a potential problem in susceptible turfgrass varieties wherever soil salinity increases as a result of using suboptimal irrigation water and where restrictions on water use reduce leaching capabilities. The limitation of effective fungicides makes cultural decisions for reducing salinity and overseeding with tolerant varieties all the more important for disease control.

Mary W. Olsen is an extension specialist and professor in the department of plant sciences at the University of Arizona, Tucson. She provides information on the identification, prevention and control of plant diseases in Arizona and conducts research on important diseases of cotton, grains, forage, vegetables, turf and ornamental plants.

REFERENCES

Camberato, J. J., Peterson, P.D. and Martin, S.B. 2006. Salinity and salinity tolerance alter rapid blight in Kentucky bluegrass, perennial ryegrass, and slender creeping red fescue. Applied Turfgrass Science, doi:10.1094/ATS-2006-0213-01-RS.

Craven, K.D., Peterson, P.D., Windham, D.E., Mitchell, T.K. and Martin, S.B. 2005. Molecular identification of the turf grass rapid blight pathogen. Mycologia, 97, 163-169.

Kopec, D., Olsen, M.W., Gilbert, J., Bigelow, D.M. and Kohout, M. 2004. Cool-season grass response to rapid blight disease. Golf Course Management Magazine, Research, December 2004, pp 78-81. GCSAA, Lawrence, KS.

Olsen, M.W., Bigelow, D.M., Gilbertson, R.L., Stowell, L.J. and Gelernter, W.D. 2003. First report of a Labyrinthula sp. causing rapid blight disease of rough bluegrass and perennial ryegrass. Plant Disease, 87, 1267.

Stowell, L.J., Martin, S.B., Olsen, M.W., Bigelow, D., Kohout, M., Peterson, P.D., Camberato, J. and Gelernter, W.D. 2005. Rapid Blight: A New Plant Disease. APS Feature Article, July 2005, http://www.apsnet.org/online/feature/rapid/.