New and Emerging Turfgrass Diseases

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Bottom line

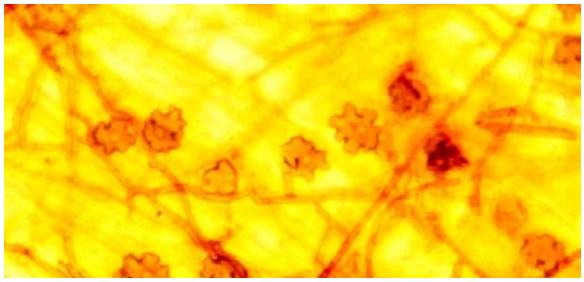
New disease problems emerge periodically as a result of unusual weather patterns, ever-increasing expectations for turfgrass perfection (and the stress this places on turf) and the use of new, specific fungicides that have narrower spectra of control than older products. In this issue of *PACE Insights,* we will review four pathogens that have emerged as problems on golf courses within the last few years, and will present our current understanding of their biology and management.

Kikuyugrass Decline

Suspect organism: *Gaeumannomyces graminis*
Symptom expression: This new disease appears in the late summer and fall on kikuyugrass fairways. It appears to be more severe where irrigation uniformity is a problem, suggesting that low moisture may exacerbate the symptoms (Figure 1). The fungus attacks the roots of the kikuyugrass resulting in moisture and nutrient stress. Because roots are damaged, scalping can be associated with the disease. Characteristic dark runner hyphae and lobate hyphopodia (infection structures) are produced on stolons and roots and can be identified under the microscope (Figure 2).
Management: Two golf courses in Southern California that were diagnosed with this disease treated using Heritage at 0.4 oz/1000 sq ft. The product was watered in following application. Following application, the quality of the kikuyugrass improved to produce a consistent high quality fairway. This evidence is anecdotal, but research trials in 1999 should help determine if the disease is as serious as it appears. Courses that were diagnosed with the disease and did not treat experienced continued fairway decline.

Figure 1. Kikuyugrass decline symptoms. Note the distribution surrounding the irrigation head in the center of the photograph. Infected plants with damaged roots may be more susceptible to drought.

Figure 2. Light micrograph of dark ectotrophic hyphae (on the outside of the roots and stolons) and lobate hyphopodia (infection structures) associated with kikuyugrass decline. Approximate magnification 400 X.



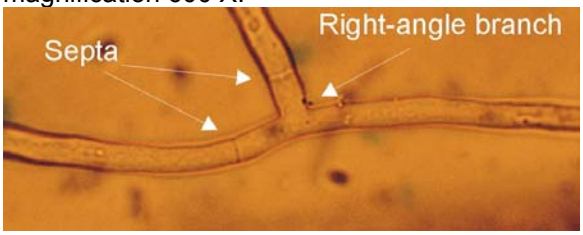
Brown patch on kikuyugrass fairways

Suspect organism: ***Rhizoctonia*** sp. (probably *R. solani*)
Symptom expression: For the past several years, this disease has attacked Southern California kikuyugrass fairways, causing serious damage during the fall and spring. We believe that the disease became established during the heavy El Niño rainfall year of 1993. The symptoms range from small patches to larger areas of coalescing patches of dead or dying turf (Figure 3). The advancing margin of the disease typically has a chlorotic appearance (Figure 4). Microscopic observation of the fungus attacking the foliage reveals sterile septate hyphae with right angle branching patterns (Figure 5).
Management: Since 1996, a variety of products have been evaluated for control of this disease. The most efficacious treatments for control of brown patch have included (product rates/1000 square feet are listed in parentheses): Prostar (3.0 oz), Heritage (0.4 oz), Daconil 2787 (4.0 oz), Cleary's 3336 (4.0 oz), and Chipco 26019 (4.0 oz). The most popular management practice currently is to survey fairways weekly during the fall around the time of the first rainfall. When symptoms are first observed, fairways are treated using Prostar at 3 oz/1000 sq ft applied in not more than 2 gal/1000 sq ft and not watered in. Spot treatments have been tested at several courses with mixed results. More accurate mapping may improve this system but at the current time, courses with severe brown patch threats treat all fairways once the disease has been observed. Using this treatment strategy, fairway damage was limited during the 1998 El Niño.

Figure 3. Severe brown patch symptoms on a kikuyugrass fairway.

Figure 4. Chlorotic margin of a severely damaged area due to brown patch.

Figure 5. Hypha of *Rhizoctonia* illustrating the right angle branching and septa (cross walls). Approximate magnification 600 X.



Chytrid disease of poa (tentative)

Suspect organism: Unidentified chytrid
Symptom expression: This disease typically attacks poa greens during cool wet weather in November and December in Southern California. Symptoms can be small patches (Figure 6) or large areas that become chlorotic (Figure 7). The damage is rapid, appearing almost overnight. Microscopic observation of the foliage and crown tissues do not reveal bacterial or filamentous fungal pathogens. The only non-host structures that are consistently associated with this disease are football shaped objects assumed to be resting structures. Following discussions with several plant pathologists throughout the country, our best guess is that the causal organism is a member of the group of lower fungi called chytrids (*Chytridiomycetes*). Chytrids known to attack poa include *Physoderma alpina*, *P. gerhardii*, and *Synchytrium graminicola*.

Management: There are no products or management practices known to control this suspected disease. However, courses that have used mancozeb in a rotation for algae or *Pythium* prevention appear to have also prevented this disease when applications were made in early November.

Figure 6. Initial symptoms of Chytrid disease of poa. Spots of damaged turf can develop very rapidly.

Figure 7. Severe symptoms of the suspected Chytrid disease of poa.

Figure 8. Resting structures inside a leaf cell that were originally thought to be a chytridiomycete fungus.

Algae (Oscillatoria) of poa and bentgrass greens

Suspect organism: *Oscillatoria* (motile blue-green algae)
Symptom expression: Symptoms begin as light green areas and develop into chlorotic spots of thinning turf (Figures 9 and 10). A full description of the disease can be found in PACE Insights, August 1997. The disease is primarily a problem of low mown turf. The algae produces trichomes (Figure 11) which migrate to turf leaf tips. Iron chelators and phytotoxins produced by the algae are thought to speed senescence of the leaf resulting in premature chlorosis and leaf death. The result is expanding areas of chlorotic and dying turf.
Management: The algae can be controlled by multiple applications of Daconil (Ultrex or 2787 formulation) at the highest labeled rate for algae. Three weekly applications should be made, with the product applied in not more than 2 gal water/1000 sq ft.

Figure 9. Light chlorotic spots caused by algae seem to begin at the margin of greens and spread into the green by clippings.

Figure 10. Note the mower pattern in distribution of the algal-induced chlorotic spots. Contaminated clippings from the edges of the greens falling from the mower are thought to spread the algae into the centers of the greens.

Figure 11. Trichomes (dark green slime) of *Oscillatoria* that have moved up to the leaf tips in search of light. This sample was incubated in the dark for an extended period (24 – 48 hrs) to stimulate the alga to move to the leaf tips.

Note: Always obtain a written recommendation from a pest control advisor licensed in your county prior to a pesticide application. Follow all label instructions regarding worker and environmental protection including: storage, handling, mixing, application and container disposal.

Year 2000 or Y2K Compliance at PACE

Most of you have heard of the Y2K issue and have some idea of the range of problems that may occur when computers meet the new millennium. This past fall, PACE replaced all computers, and installed Windows 98 and Office 98 for key data management systems. Our databases have been evaluated for date fields that might cause problems and we will continue to be diligent to prevent any data loss or damage as a result of Y2K. If you are interested in Y2K issues and prevention of data losses you may find the following web pages of interest:

Microsoft Year 2000 Page:
http://www.microsoft.com/technet/topics/year2k/default.htm
California 2000 Home Page:
http://www.year2000.ca.gov/
Welcome to the Federal Aviation Administration's Year 2000 Web Site: http://www.faay2k.com/
Year 2000 Biomedical Engineering Database:
http://www.y2k.gov.au/biomed/index.html
New South Wales Year 2000 Home Page:
http://www.y2k.gov.au/

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