

Biology and Integrated Management of Rapid Blight, a New Disease of Rough Bluegrass, Perennial Ryegrass, Annual Bluegrass, and Creeping Bentgrass

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Objectives:

1. Conduct studies on the biology of *Labyrinthula* and the epidemiology of rapid blight disease.
2. Determine the role of soil and water conditions on occurrence of rapid blight.
3. Evaluate turfgrass species for their susceptibility to rapid blight and suitability as overseeding grasses.
4. Devise integrated control strategies for management of rapid blight epidemics.

Start Date: 2003

Project Duration: three years

Total Funding: \$77,720

Rapid Blight is caused by a poorly understood single-celled microorganism called *Labyrinthula*. Rapid blight symptoms appear as irregularly shaped patches of chlorotic or necrotic turf ranging from 6 inches to 6 feet in diameter. Often these patches exhibit a water-soaked appearance along a darkened edge. Rapid blight can affect juvenile and mature turf, although overseeded grasses in the seedling stage at first mowing are especially susceptible.

Our laboratory has focused on initial investigations into the biology, epidemiology, and management of this new threat to the turf industry. We conducted a series of growth chamber experiments to determine the relative growth of 14 different *Labyrinthula* spp. isolates collected across the United States under varying temperatures and levels of salinity. The results from these experiments indicate that the *Labyrinthula* from turf grow best in a range between 22°C to 26°C and at relatively wide range of salinity levels from 3.5 to 10.5 dS/m.

We conducted experiments to evaluate 49 different cool-season turfgrass species for their relative tolerance to the disease. All grasses tested showed susceptibility to rapid blight but at markedly varying levels. The grass species most tolerant to rapid blight were the fescues, creeping bentgrasses, and alkaligrasses.

During the fall of 2003 we initiated a nationwide Rapid Blight - Disease, Water, and Soil Survey to gather vital information on soil and water salinity and the environmental conditions associated with disease outbreaks. The response allowed us to assemble a database on soil, water, and timing parameters. We also

characterized the *Labyrinthula* sp. through DNA studies. Our results confirm the genetic identity and support previous morphological characterization of the rapid blight pathogen.

In 2001, Martin found trifloxys-



Rapid Blight symptoms appear as irregular shaped patches of chlorotic or darkened turf. Upon close examination, the darkened turf foliage appears water-soaked and plants often are reduced in size.

trobin (Compass), pyraclostrobin (Insignia) and mancozeb (Fore) to have value for control of rapid blight in the field. We conducted extensive greenhouse screening of fungicides for efficacy against the disease during the year. Results indicated that Insignia (pyraclostrobin) at 0.055 grams (g) active ingredient (ai) m⁻², and Compass (trifloxystrobin) at 0.038 g ai m⁻², controlled the disease as single-component sprays. Fore Rainshield (mancozeb) at 1.95 g ai m⁻² and Fore + Insignia or Fore + Compass tank mixes were more effective than Fore alone. Daconil Ultrex (chlorothalonil) at 0.98 g ai m⁻² controlled the disease up to two weeks after inoculation.

Azoxystrobin (Heritage), fosetyl-

Al (Chipco Signature), mefenoxam (Subdue Maxx), propamocarb (Banol), iprodione (Chipco 26GT), myclobutanil (Eagle), propiconazole (Banner Maxx), triadimefon (Bayleton), tebuconazole (Lynx), thiophanate methyl (Cleary 3336), chloroneb (Terraneb SP), ethazole (Terrazole), flutolanil (Prostar), polyoxin(Endorse), and fludioxonil (Medallion) did not control rapid blight in greenhouse trials.

Summary Points

- Clemson University researchers have determined that *Labyrinthula* grow best *in vitro* at a range between 22°- 26°C and at relatively wide range of salinity levels from 3.5 - 10.5 dS/m.
- Results from experiments to evaluate 49 different cool-season turfgrass species for their relative tolerance to the disease indicate that the grass species most tolerant to rapid blight are certain fescues, creeping bentgrasses, and alkaligrasses, while annual and rough bluegrasses, other bentgrasses, and most ryegrasses are quite susceptible.
- Researchers report progress on a nationwide Rapid Blight - Disease, Water, and Soil Survey, with assistance of USGA agronomists, to gather vital information on soil and water salinity and the environmental conditions associated with disease outbreaks.
- Molecular studies of *Labyrinthula* isolates confirm their genetic identity and support previous morphological characterization of the rapid blight pathogen.
- Extensive greenhouse fungicide screenings show that Insignia, Compass, Fore, and tank mix combinations of Fore and Insignia or Compass are the most efficacious treatments for rapid blight control.