

Evaluation of Fungicides for Control of Rapid Blight of *Poa trivialis* (2003)

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Abstract

Rapid blight is a new disease of cool season turf grasses that has occurred on over a dozen golf courses in Arizona. It is now known to be caused by *Labyrinthula terrestris*, an organism in a group referred to as the marine slime molds. A trial was conducted in fall 2003 and winter 2004 to evaluate efficacy of selected fungicides for control of rapid blight at a golf course in central Arizona with a previous history of disease. Plots were established in late October 2003 on a practice green on which Bermuda was overseeded with *Poa trivialis*. Treatments included Compass, Insignia, Fore, Bordeaux, Kocide 2000, Microthiol Disperss, Ecoguard and Floradox in various combinations and application dates. Disease symptoms appeared about 6 weeks after the first mowing and were evaluated in mid January. Results indicate that applications of Fore, Insignia and tank mixes of Insignia and Compass with Fore gave excellent control. Bordeaux, Compass alone, Compass alternated with Fore, Insignia alone, and Kocide gave good control. Microthiol Disperss, Floradox and Ecoguard gave poor control.

Introduction

Rapid blight is a new disease of cool season turf grass on golf courses in Arizona. It is caused by *Labyrinthula terrestris*, an organism in a group referred to as the marine slime molds (Bigelow, et al., in press). In symptomatic leaves, numerous spindle-shaped cells are visible under the light microscope either inside host plant cells or floating freely after the plant tissue is macerated. These cells form colonial networks in culture and travel by means of gliding motility. They are characteristic of *Labyrinthula*, a genus of the Labyrinthulomycota (Porter, 1990). Generally associated with plants, algae or sediments of marine systems, its occurrence in fresh water terrestrial systems is unusual. *Labyrinthula zosterae* has been described as the causal agent of a wasting disease of eelgrass (Muehlstein, et al., 1991), but this is the first report of a *Labyrinthula* species as a pathogen of a terrestrial plant. Initially, the causal agent of rapid blight was tentatively identified as a chytridiomycete fungus (Martin et al., 2002) and the disease became known as "chytrid disease". We now know that this name is not applicable and should not be applied to rapid blight.

Early symptoms of disease include patches of turf that appear water soaked, slightly sunken and darker than healthy turf. Affected turf yellows and dies. Small patches several inches across may enlarge rapidly to over a foot in diameter, coalesce and result in larger areas of dead turf. Mowing and foot traffic seem to increase disease incidence rapidly. In a few cases, entire plantings of cool season turf seedlings have been lost.

Rapid blight was first described in southern California in 1995, but it now has been reported in eleven states (Martin et al., 2002). In most cases, including those in Arizona, disease has occurred on golf courses using irrigation water with high salinity and/or high bicarbonate levels. It has not been observed in residential or commercial lawns. In Arizona, rapid blight occurs in fall and affects turf varieties used for overseeding Bermuda such as rough bluegrass (*Poa trivialis*), perennial rye (*Lolium perenne*), annual bluegrass (*Poa annua*) and colonial bent (*Agrostis tenuis*). Bermuda (*Cynodon* spp.) appears to be unaffected

In previous studies in the southeastern United States, preventive treatments using Mancozeb (Fore) and/or Trifloxystrobin (Compass) at high rates for *Pythium* blight control have been effective in controlling disease. Trials were conducted at a golf course in central Arizona with a known history of disease to determine the efficacy of other fungicide treatments for prevention and control in Arizona.

Materials and Methods

Plots were established on a practice chipping green at a golf club near Litchfield, Arizona in October 2003. The green was overseeded with *Poa trivialis* and maintained on a regular maintenance schedule including irrigation with relatively high salinity (EC > 3.5) water. Eighteen treatments were made up of different rotations, combinations and timing of applications of Fore; strobilurin fungicides Compass and Insignia; copper fungicides Kocide and Bordeaux; soluble sulfur, Microthiol Disperss; a biological, Ecoguard; and a stabilized oxygen product, Floradox (see Table 1). Plots were 3 ft x 10 ft with a 2 ft alley between every two plots. There were eight replications of each treatment in a randomized complete block experimental design. Fungicide treatments were applied with a CO₂ pressurized sprayer (R&D Sprayers, Inc.) at 30 lb psi using two fine screen fan nozzles spaced 19 inches apart on the boom. Applications were made at a volume of 60 gal water/A. The green was overseeded with *Poa trivialis* on October 10, 2003. The first application of all other treatments was made on November 1, 2003, the day after the first mowing.

Plots were visually rated for disease on a scale of 1 to 9 with 1 = very poor with little *Poa trivialis* remaining and 9 = excellent with complete coverage of *Poa trivialis* remaining. Disease was observed in plots on December 12, 2003 and all plots were evaluated on January 12, 2004. Means of each replication within each treatment were subjected to ANOVA and Tukey test.

Results

Disease ratings are given in Table 1. Results indicate that high rates of mancozeb (Fore) alone and in combination with trifloxystrobin (Compass) and pyraclostrobin (Insignia) are effective in reducing rapid blight on *Poa trivialis*. Compass and Insignia mixed or rotated with mancozeb gave excellent control as did Insignia alone. Observations of the plots two months after the last spray indicated that these treatments were still effective while others were not. To a lesser extent, copper compounds were effective in controlling disease. Ratings of treatments with Bordeaux and Kocide 2000 indicated they were significantly less effective than the most effective treatments but much more effective than Micronized sulfur spray (Microthiol Disperss) and the biologicals or nutrients alone (Ecoguard, Floradox) that were used in this trial. Field observations indicate that curative applications of chemicals usually contain disease if applied early, but do not eradicate it.

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Literature cited

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Table 1. Efficacy of fungicide applications for control of rapid blight of *Poa trivialis* on a golf course in central Arizona with a history of rapid blight. Turf was rated for quality based on amount of diseases on Jan 12, 2004, 5 weeks after initial symptoms appeared. Quality was rated on scale of 1-9 with 1=very poor and 9=very good. Values are the average of 8 replications.

Treatment	Active ingredient	Rate*	Application dates†	Turf quality‡
Insignia	pyraclostrobin	0.90 oz	1,3,5,6,7,8	8.3 a
Insignia + tank-mix Fore	pyraclostrobin + mancozeb	0.50 oz 6.0 oz	1,3,5,6,7,8	8.4 a
Insignia alternate with Fore	pyraclostrobin, mancozeb	0.50 oz 6.0 oz	1,5,7 3,6,8	8.3 a
Insignia alternate with Ecoguard	pyraclostrobin, <i>Bacillus licheniformis</i> & IBA	0.50 oz 20 fl oz	2,4,7 1,3,5,6,8	8.3 a
Fore	mancozeb	8.0 oz	1,3,5,6,7,8	8.4 a
Compass + tank-mix Fore	trifloxystrobin + mancozeb	0.20 oz 6.0 oz	1,3,5,6,7,8	8.6 a
Compass alternate with Fore	trifloxystrobin, mancozeb	0.2 oz 6.0 oz	1,5,7 3,6,8	7.8 ab
Kocide 2000	copper hydroxide	2.2 oz	1-8	7.8 ab
Insignia	pyraclostrobin	0.50 oz	1,3,5,6,7,8	7.5 ab
Bordeaux	copper sulfate and hydrated lime	3.5 oz	1-8	7.6 ab
Compass	trifloxystrobin	0.25 oz	1,3,5,6,7,8	6.1 b
Ecoguard	<i>Bacillus licheniformis</i> & IBA	20 fl oz	1-8	4.6 bc
Microthiol Disperss	soluble sulfur	1.8 oz	1-8	3.8 c
Floradox	stabilized oxygen	3.7 fl oz	1-8	3.6 c
Control		NA	NA	3.9 c

Note. NA = not applicable.

*Rates are given for product per 1,000 square feet. Chemicals were applied in 60-gal of water/A at 30 lbs/in².

†Application dates: 1 = Nov. 7; 2 = Nov. 14; 3 = Nov. 21; 4 = Nov. 28; 5 = Dec. 5; 6 = Dec. 17; 7 = Dec. 30, 2003; and 8 = Jan. 12, 2004.

‡Numbers followed by the same letter are not significantly different using Tukey's method for pairwise comparison of means.