

CHEMICAL CONTROL OF ANTHRACNOSE ON ANNUAL BLUEGRASS

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INTRODUCTION

Anthracnose, caused by *Coletotrichum graminicola*, can cause severe damage on golf greens in California where *Poa annua* has mostly replaced the original bentgrass. The disease symptoms vary depending on environmental conditions. The disease is most severe in warm (80-90 F), humid weather (2) with entire stands of turf becoming blighted in only a few days (3). Under these conditions the symptoms are expressed as a leaf blight appearing in irregularly shaped, yellowish patches which may quickly turn tan to brown in color as temperature and humidity increase (1). Under cool, wet conditions the symptoms of anthracnose include a basal stem rot (1). Diseased areas of turf can range in size from a few centimeters to several meters (4). The disease is most destructive in areas with low soil fertility (2,3) and excess moisture (4).

Anthracnose is diagnosed by the presence of acervuli on the infected plants. These fruiting structures are readily observable with a 10X hand lens and appear as elongate brown or black bodies with a varying number of protruding stiff, spike-like setae present (2,3,4). It is within these acervuli that the conidia of *C.graminicola* are produced, released, and ultimately serve as inoculum for the spread of the disease (1,3). *C. graminicola* is often found colonizing mature leaves and accelerates the senescence of these older blades. It is known to over-winter in both dead and living tissue, however its' principal means of survival is as a saprophyte on plant residues such as thatch (1,3). It is this debris which provides sanctuary for the pathogen and the production of inoculum for the coming season (2,4).

MATERIALS AND METHODS

Trial 1 was initiated in July 1992 on a *Poa annua* nursery green of a golf course in the Moro Bay area of California. Plot sizes were 8 X 10 ft with each treatment being replicated 4 times. Trial 2 was initiated in August 1993 at the same location as trial 1. Materials (table 1) and methods (for rates and intervals see

tables 2,3 and 4) were essentially the same but plot sizes were reduced to 4 X 6 ft with 4 replicates. The test area was drenched with label rate of Daconil 2787 three weeks prior to the initiation of trial 2 and received a top dressing of (NH₄S₀₄) at 0.8 lb/1000 sq ft 3 weeks after initiation. All plots were similar in disease rating at the beginning of the trial.

Chemicals were applied using a hand-held CO₂ sprayer (R & G check on it) at 22 psi using an LF-3 800 T-JET nozzle. All fungicides were mixed immediately prior to application. Turf was mowed prior to application and irrigated 10 and 18 hours post application. Fertilizer application followed normal course practices until the fourth week when it was discontinued for two weeks. All rates are per 1000 sq ft and applied in 164 oz of water (2 gal/i 000 sq ft).

Table 1. Fungicides tested

| 1992 | 1993 |
|--|--|
| Bayleton 25 DF (triadimefon .Miles) | same |
| Broadway (chlorothalonil 41 .5 WP + fenarimol 2.5 WP .Dow Elanco) | same |
| Daconil 2787 41 .5 WP (chlorothalonil . Dow Elanco) | |
| Eagle 40 WP (myclabutanil .Rhom & Hass) | same |
| RH-061 1 (myclobutanil 2.25 WP + mancozeb 60 WP .Rhom & Hass) | same |
| Rubigan 11 .6 WP (fenarimol .Dow Elanco) | 11 .6 AS |
| EXP10064C 21 F (bromuconazole . Rhone-Poulenc) | |
| EXP10345A 40 WP (cyproconazole . Rhone-Poulenc) | |
| Chipco 26419 50 WP (iprodione . Rhone-Poulenc) | |
| | Greenex (biological soil conditioner mixture .Grotek, Inc.) |
| | Lynx 25 DF (tebuconazole .Miles) |
| | Curalan (vinclozolin .Dow Elanco) |

Results

Trial 1, 1992

Evaluations were made at 4 and 6 weeks. Evaluation was a subjective scoring with 0 being healthy turf and 5 being very severely damaged turf. Prior to the initiation of the trial there were no significant differences in disease rating between plots.

At the 4 week rating Broadway (both rates), Eagle and RH-061 1 were the most effective treatments but were not significantly different than the non-treated control (table 2). Bayleton, while appearing worse than the control was not significantly different. All other treatments were rated more severely than the control and were significantly different (table 2). On the part of the experimental chemicals this difference may be due more to phytotoxicity than lack of control.

At the 6 week rating, with the turf not receiving fertilizer for 2 weeks, the four best treatments at the 4 week evaluation were still the highest rated. These were followed by EXP 10064C (1 oz), Rubigan and Bayleton which while rated higher than the non-treated control were not significantly different from it. The other 3 experimental chemicals were rated below the non-treated control, again possibly due to phytotoxicity (table 3). As long as the turf received adequate nutrition none of the more effective treatments were significantly different from the control (table 2). However, when the turf was less than adequately fertilized RH 0611, Broadway and Eagle all rated significantly better than the non-treated control (table 3).

Trial 2, 1993

In the results for the 1993 trial Daconil 2787 gave the best results followed by Greenex at the 14 oz rate at the 7 day interval, Rubigan at the 3 oz rate and Greenex at 14 oz and at the 7 day then 14 day interval. These treatments were followed by RH-061 1, Lynx and Greenex at the 7 oz rate. All other treatments except Bayleton, while appearing better than the control were not significantly different. Bayleton was ineffective and did not appear any better than the control.

Table 2. 1992. Effect of fungicide sprays for the control of anthracnose on *Poa annua* golf greens - Morro Bay, CA - week # 4 (fertilized)

| Treatment | oz/1000sq ft | Interval (days) | Rating |
|--------------------------------|--------------|-----------------|--------|
| Broadway | 6 | 14 | 0.4 a |
| Eagle | 6 | 14 | 0.4 a |
| RH-0611 | 6 | 14 | 0.5 a |
| Broadway | 8 | 14 | 0.6 a |
| Control | | | 1.2 ab |
| Bayleton | 2 | 30 | 2.3 bc |
| EXP10064C | 1 | 14 | 2.6 cd |
| EXP10064C + Chipco 26019 | 2 | 14 | 3.0 cd |
| Rubigan | 3 | 30 | 3.4 de |
| EXP10064C | 2 | 14 | 4.2 e |
| EXP10354A +0.3 Chipco 26019 | 2 | 14 | 4.4 e |

Ratings: 0= no disease, 5= severe disease.

Numbers followed by the same letter are not significantly different (P = 0.05) Duncan-Waller K-ratio (LSD) test.

Table 3. 1992 Effect of fungicide sprays for the control of anthracnose on *Poa annua* golf greens - Morro Bay, CA - week # 6 (2 weeks after last fertilization)

| Treatment | oz/1000 sq ft | Interval (days) | Rating |
|--------------|---------------|-----------------|--------|
| RHO611 | 6.0 | 14 | 0.0 a |
| Broadway | 6.0 | 14 | 0.0 a |
| Broadway | 8.0 | 14 | 0.3 a |
| Eagle | 0.6 | 14 | 0.5 ab |
| EXP10064C | 1.0 | 14 | 1.5 bc |
| Bayleton | 2.0 | 30 | 1.8 c |
| Rubigan | 3.0 | 30 | 1.8 c |
| Control | | | 2.0 cd |
| EXP 10064C + | 1.0 | 14 | |
| Chipco 26019 | 2.0 | 14 | 3.0 de |
| EXP10064C | 2.0 | 14 | 3.6 e |
| EXP 10354A | 0.3 | | |
| Chipco 26019 | 2.0 | 14 | 3.9 e |

Ratings: 0= no disease, 5= severe disease.

Numbers followed by the same letter are not significantly different (P = 0.05) Duncan-Waller K-ratio (LSD) test.

Table 4. 1993. Effect of fungicide sprays for the control of anthracnose on *Poa annua* golf greens - Morro Bay, CA

| Treatment | oz/1000 sq ft | Interval | Rating |
|---------------------------|---------------|----------|-----------|
| Daconil 2787 | 6 | 14 | 0.4 a |
| Greenex | 14 | 7 | 0.6 ab |
| Rubigan | 3 | 28 | 1.0 abc |
| Greenex | 14 | 7- 14 | 1.0 abc |
| RH-0611 | 3.74ai | 14 | 1.2 abc |
| Lynx | 1 | 28 | 1.4 abc |
| Greenex | 7 | 7-14 | 1.4 abc |
| Rubigan + Daconil 2787 | 1.5 6 | 14 | 1.6 abcde |
| Curalan | 1.5 | 14 | 2.0 abcde |
| Greenex | 28 | 7- 14 | 2.2 abcde |
| EXP1O3O7A + EXPO21 64B | 1.5 1.2 | 21 | 2.6 abcde |
| Rubigan + Curalan | 1.5 1.5 | 14 | 2.6 abcde |
| EXP1 0452A | 2 | 21 | 2.8 abcde |
| Rubigan | 1.5 | 14 | 3.4 bcde |
| Eagle | 2.5 | 14 | 3.4 bcde |
| EXP1O3O7A + EXPO21 64B | 2.0 1.6 | 21 | 3.6 cde |
| Control | | | 4.4 de |
| Bayleton | 2 | 14 | 4.6 e |

Ratings: 0= no disease, 5= severe disease.

Numbers followed by the same letter are not significantly different (P = 0.05) Duncan-Waller K-ratio (LSD) test.

Discussion

Treatments 1, 2, 4, 5, 8, 12, and 13 were all found to be significantly different from the control. Interestingly the biologically based product Greenex performed at least as well as the conventional fungicide treatments, and in some cases outperformed some chemicals in regard to improving the health of the turf. Preliminary evidence suggests that Greenex acts as a soil conditioner as well as promoting the enhanced decomposition of thatch.