

Evaluation of Fungicides for Control of Anthracnose Caused by *Colletotrichum graminicola* on Annual Bluegrass Greens

Principal Investigators: Wendy Gelernter, Ph.D. and Larry J. Stowell, Ph.D., CPPP, CPAg

Cooperator: Gary Dalton, San Diego Country Club

Sponsors: David Ross, Zeneca and Gary Braness, Bayer

Summary: In a replicated field trial at San Diego Country Club, Chula Vista, CA, monthly applications of Heritage at 0.2 and 0.4 oz/1000 sq ft and Lynx at 1.5 oz/1000 sq ft provided excellent protection against anthracnose attack on annual bluegrass greens when compared to Bayleton at 4.0 oz/1000 sq ft or the non-treated control plots. Less than acceptable performance of Bayleton may have been due to the monthly application interval (as opposed to a biweekly application interval).

charging with compressed CO₂. The spray lines were purged with CO₂ and then water prior to changing treatments. The entire green was watered for five minutes following application of all treatments on each date (approximately 1/10 inch).

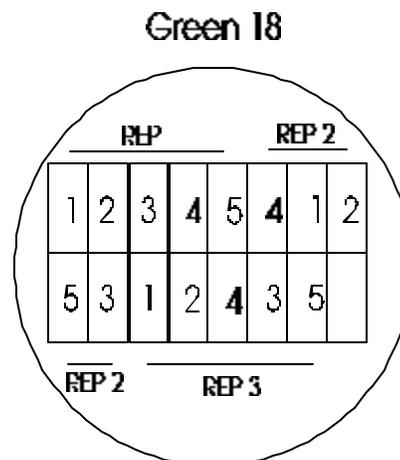
Materials and Methods:

Location: Research plots were located on a predominantly *Poa annua* green (Green 18) at San Diego Country Club, Chula Vista, CA. At the initiation of the trial, there were no signs of disease.

Experimental Design and Application: Plots measuring 7 ft by 18 ft were located on the predominantly *Poa annua* 18th green at San Diego Country Club (Figure 1).

Each treatment was repeated three times in a randomized design. Experimental treatments were applied with a bicycle sprayer using tandem booms and 8008vs flat fan nozzles powered by CO₂ to deliver 30 psi at the boom and 3.9 gal/1000 sq ft. Calibration of each nozzle was confirmed prior to each application to be within 5% of the desired nozzle flow rate. The boom height was adjusted to 17 inches. The spray swath was 7.2 ft. Speed was monitored using a wheel driven speedometer at 2.0 mph (periodically calibrated to be within 5% of the actual speed). Five-gallon stainless steel beverage spray tanks were filled with water to the desired dilution volume using a Great Plains Industries digital flow meter, Wichita, KS, calibrated to deliver volumes within 1% of the digital value displayed on the meter. Tanks were agitated by shaking twenty times prior to

Figure 1. Plot layout. San Diego Country Club, Chula Vista, CA.



Treatments:

Due to the presence of a confirmed anthracnose infection in plots for treatment 3 (Bayleton) and treatment 5 (non-treated), the superintendent applied Daconil 2787 at the rate of 11 oz/1000 square feet on the entire green on 5/29/96 and again on 6/1/96. These treatments stopped the spread of the anthracnose, but did not improve recovery of the already dead or dying plants. Damage from this infection lasted for the duration of the trial.

TRT #	PRODUCT	RATE/1000 SQ FT	TIMING
1	Heritage 50 WG	0.2 oz	4/22, 5/20, and 6/17
2	Heritage 50 WG	0.4 oz	Same as above
3	Bayleton 25	4.0 oz	Same as above
4	Lynx 25 DF	1.5 oz	Same as above
5	Non-treated	_____	_____

Evaluations:

Identification of disease organisms was carried out by microscopic examination of 5 turf samples per plot. These samples were taken with a 3/8" soil probe whenever gross disease symptoms were observed in experimental plots.

Turfgrass quality ratings were conducted at 7 - 14 day intervals. Turfgrass quality ratings were estimated visually taking into account the color and density of the poa stands, with 0 representing dead turf, and 9 representing the best possible quality turfgrass. In almost all cases, turfgrass quality was directly correlated with the incidence and severity of anthracnose infection.

Data was subjected to analysis of variance, and treatment means separated using Fisher's LSD, where $P < 0.05$ (data print-out attached).

Results and Discussion:

Identity of causative organism: Anthracnose infection was confirmed in non-treated and Bayleton plots on 5/23/96 by microscopic observation of the foliage and crowns that revealed acervuli, setae and lunate hyaline conidia that are typical for *Colletotrichum graminicola*. Active disease was not detected on any subsequent sampling dates.

Impact of tournament preparations:

Preparations for tournaments held at the golf course on 5/13 and 5/20 resulted in symptoms

of turfgrass stress in all plots on the 5/29/96 sampling date. These preparations, which included double mowing at low heights, as well as drying of the greens prior to the tournament, followed by compensatory irrigation following the tournament, also made unprotected turf more susceptible to infection with anthracnose, which is a stress-related disease.

Turfgrass Quality Ratings:

Heritage (at both rates tested) and Lynx provided excellent control of anthracnose (Figure 2, Table 1). Heritage at the 0.4 oz/1000 rate performed marginally better than Heritage at the 0.2 oz/1000 rate, but it is questionable whether the increased cost of the 0.4 oz rate is justified by the results. Heritage at either rate tested performed marginally better than Lynx, but again, all Heritage and Lynx treatments provided better than acceptable control of anthracnose throughout the study.

The dip in turf quality observed in all plots on 5/29/96 was the result of turf stress brought on by preparations for tournaments in mid-May (see above). This stress also promoted anthracnose in non-treated and Bayleton plots in late May, although Heritage and Lynx plots remained disease-free. Following the late May infection with anthracnose, there were no further incidences of anthracnose infection in any of the plots during the remainder of the trial. Turfgrass quality declined in the Heritage and Lynx plots during July, as summer stresses lowered stand vigor of the entire green. Bayleton and non-treated plots improved slightly during this time period, due to their slow recovery and re-growth from anthracnose-related damage.

Figure 2. Mean turfgrass quality ratings, where 0 = dead turf and 9 = highest quality turf possible. On each date, values followed by the same letter are not significantly different (Fisher's LSD, $p < 0.05$). Turfgrass quality is directly related to the level of anthracnose control achieved.

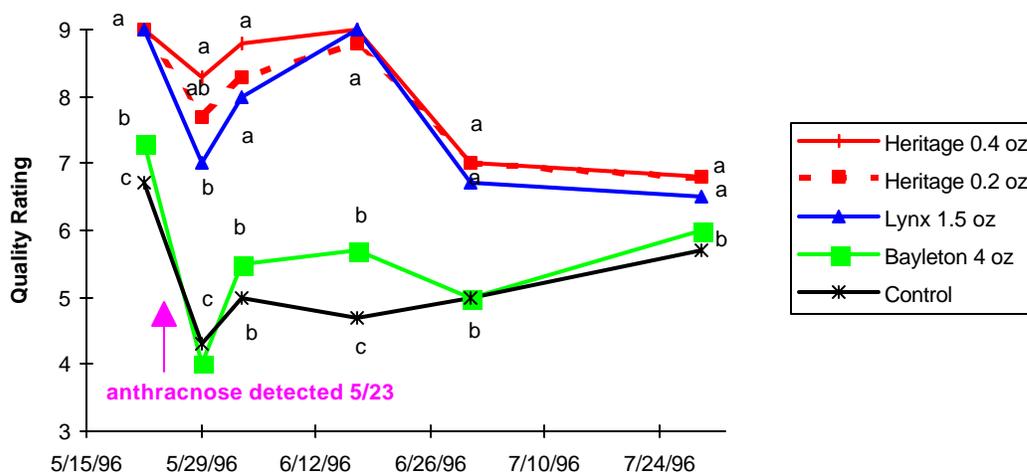


Table 1. Mean turfgrass quality ratings, where 0 = dead turf and 9 = highest quality turf possible. Reading vertically on each date, values followed by the same letter are not significantly different (Fisher's LSD, $p < 0.05$). Turfgrass quality is directly related to the level of anthracnose control achieved.

PRODUCT	RATE/1000	5/22/96	5/29/96	6/3/96	6/17/96	7/1/96	7/29/96
Heritage 50 WG	0.2 oz	9.0 a	7.7 ab	8.3 a	8.8 a	7.0 a	6.5 a
Heritage 50 WG	0.4 oz	9.0 a	8.3 a	8.8 a	9.0 a	7.0 a	6.8 a
Bayleton 25	4.0 oz	7.3 b	4.0 c	5.5 b	5.7 b	5.0 b	5.7 b
Lynx 25 DF	1.5 oz	9.0 a	7.0 b	8.0 a	9.0 a	6.7 a	6.8 a
Non-treated	_____	6.7 c	4.3 c	5.0 b	4.7 c	5.0 b	6.0 b

Anthracnose was the primary cause of reduced quality turf, causing thinning and dead patches in Bayleton and non-treated plots. Although Bayleton performed better than the non-treated control on most dates, the level of anthracnose control provided was unacceptable. It is possible that increased frequency of Bayleton applications (every two weeks, rather than every four weeks) would have improved control.

The slow increase in turfgrass quality in July in the Bayleton and non-treated plots illustrates the delayed recovery that takes place once anthracnose has taken its toll in the summer. Rescue treatments (Daconil 2787, applied at a rate of 11 oz/1000 square feet by the superintendent), although effective in stopping the spread of the disease, did not improve turfgrass quality because new plants are difficult to establish in dead spots during the summer.

On the basis of these results, use of either Heritage or Lynx on a preventive, monthly basis will result in lower pesticide inputs compared to Bayleton and the high rate of contact fungicides (Daconil 2787) used to rescue the plot area. By applying products such as Heritage or Lynx in advance of anticipated stresses to turf (tournaments, leaching events etc) superintendents should be able to avoid one of their key summer disease problems -- anthracnose on poa greens.