**Evaluation of Preventative Fungicides for Control of Summer Patch of Poa Caused by *Magnaporthe poae* - Final report (961828)**

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**Summary:** In a replicated field trial at Arrowhead Country Club, San Bernardino, CA, monthly preventative treatments of Heritage at 0.2 and 0.4 oz/1000 sq ft and Lynx at 1.5 oz/1000 sq ft provided good to excellent control of summer patch compared to monthly applications of Bayleton at 4.0 oz/1000 sq ft or the non-treated control plots. Heritage and Lynx also provided significantly improved turfgrass quality compared to the Bayleton and non-treated plots, although Lynx applications did result in significant, but reversible damage to turf. Bayleton turfgrass quality and control ratings were not significantly higher than the non-treated control plots on many of the rating dates. Based upon these results, Heritage or Lynx would be good replacements for the commercial standard Bayleton. Due to their solid performance, as well as their high residual activity, the use of Heritage or Lynx should also result in fewer pesticide applications per season for control of summer patch.

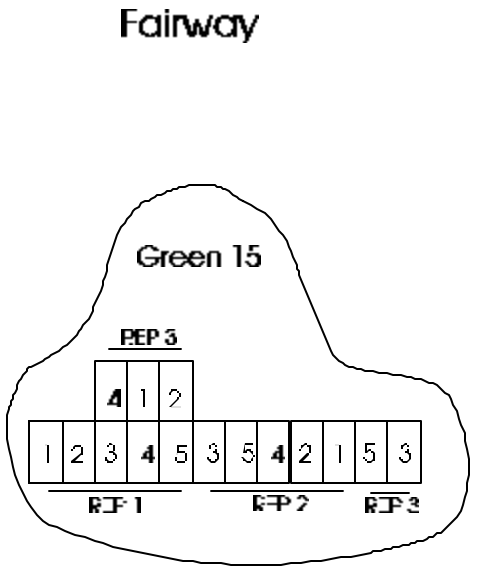
**Materials and Methods:**

Location: Research plots were located on a predominately *Poa annua* green (Green 15) at Arrowhead Country Club, San Bernardino, CA. The site was selected on the basis of the golf course's history with extremely heavy pressure from summer patch each year. At the initiation of the trial in April, there were no signs of disease.

Experimental design and application: Plots measuring 7 ft by 20 ft were located on the predominantly *Poa annua* 15th green at Arrowhead Country Club. Each treatment was replicated three times in a randomized design (Figure 1).

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.

Figure 1. Plot layout. Arrowhead Country Club, San Bernardino, CA.




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

Treatments: Treatments and application dates are listed below. Applications were initiated on a preventative basis, when average soil temperatures (from a regional CIMIS station) at a depth of 6 inches reached 65° F.for three consecutive days (4/23/96), and were repeated at monthly intervals in May and June. Continued pressure from summer patch triggered an additional, unscheduled application on 8/6/96.

| Treatment # | Product | Rate/1000 sq ft | Timing and Frequency |
|---|---|---|---|
| 1 | Heritage 50 WG | 0.2 oz | 4/23, 5/20, 6/17 and 8/6/96 |
| 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 | | Non-treated |

Evaluations: Identification of disease organisms was carried out by microscopic examination of the crowns and roots of 5 turf samples per plot. The presence of dark runner hyphae and growth cessation structures that are typical for *Magnaporthe poae* were the characters used to confirm summer patch infection. Samples were taken with a 3/8" soil probe whenever gross disease symptoms were observed in experimental plots.

Quality and disease damage ratings were conducted at approximately 14 day intervals. Turfgrass quality ratings were estimated visually taking into account the color and density of the poa stands with 0 equivalent to dead turf and 9 representing the ideal greens height turfgrass. Decreases in turfgrass quality were primarily due to either summer patch infection or fungicide phytotoxicity. Percent disease damage caused by summer patch was estimated visually. These values were converted to percent summer patch control using the formula below:

$$Percent\ summer\ patch\ control = 100 * \left( \frac{\%\ damage\ in\ nontreated - \%\ damage\ in\ treated\ plot}{\%\ damage\ in\ nontreated\ control} \right)$$

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:**

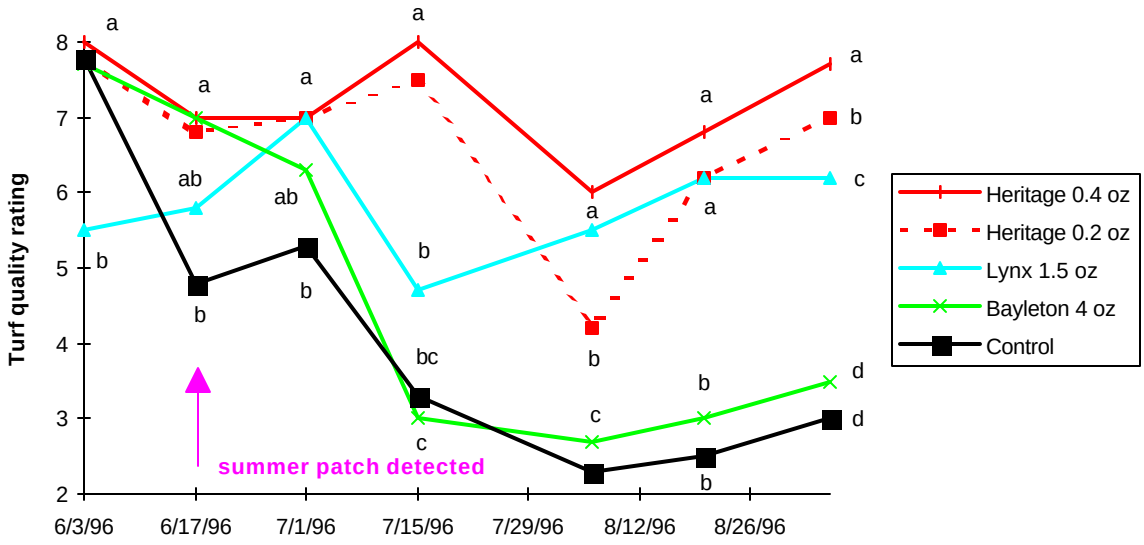
Identity of causative organism: Summer patch infection caused by *Magnaporthe poae* was first confirmed on 6/17/96 via microscopic examination. The extremely high intensity of summer patch infection at this site (without fungicide treatment, entire greens are totally destroyed each summer) has been experienced at Arrowhead Country Club for several years, making it an ideal location for this research trial.

Turfgrass quality ratings and percent control ratings: Prior to the 6/17 onset of summer patch, all plots (except plots treated with Lynx) showed excellent turf quality (Figure 2, Table 1). The significantly lower turfgrass quality ratings for Lynx plots appears to be the result of phytotoxicity that resulted in discolored, thinning and yellowing turf that was visible from a distance. This damage was first noted on 5/7/96 (two weeks following the first application), but turf showed signs of recovery by 5/20/96, one month after application. Turf once again took a dip in quality on 6/3 (two weeks after the second application) and once again recovered two

weeks later on 7/1/96. On closer examination, the damage occurred only in spots, suggesting that one biotype of poa might be more sensitive to the Lynx application than the other biotypes present on the green. This theory is supported by observations made later in the season that Lynx treated plots appeared to have higher percentages of bentgrass (occurring in small areas, 1 -2 inches in diameter) present than other plots, suggesting that a susceptible biotype of poa was indeed damaged by Lynx applications, thus allowing bentgrass to gain a competitive advantage. The possibility that the May and June damage in Lynx plots was due to summer patch infection was ruled out by the fact that summer patch infection was not detected (microscopically or visually) in any of the experimental plots (including the non-treated check) until 6/17, or 6 weeks after the first incidence of Lynx related damage was first observed. In fact, turf qualtiy in Lynx plots was significantly lower than in non-treated plots on 6/3 (Figure 2).

Figure 2. Turfgrass quality ratings. Points on the graph at each rating date that are associated with the same letter are not significantly different (Fisher's LSD, p<0.05).




Following the onset of summer patch on 6/17, Heritage at 0.4 oz/1000 provided superior control throughout the season, as indicated by high turf quality and percent control ratings (Figures 2 and 3), although a small dip in turf quality was observed on 8/6 when Heritage applications were spaced 7 weeks apart (from 6/17 to 8/6), rather than the 4 week interval used earlier in the experiment. The turf in these plots recovered rapidly following the 8/6 application, however. Heritage applied at 0.2 oz/1000 helped maintain good quality turf, although the significant decrease in turf quality on 8/6 indicates that this rate of the product is not sufficient to withstand a 7 week application interval, at least under the heavy summer patch pressure experienced at this site. Lynx also provided good summer patch control throughout the season, demonstrating excellent residual activity, as seen by the maintenance of high turfgrass quality ratings, even on 8/6 when applications had not been made for 7 weeks. The performance of Bayleton in this trial was unacceptable, resulting in significantly poorer quality turf and significantly lower percent control ratings than other treatments from the time summer patch was first detected until the completion of the trial on 9/5. On many rating dates, Bayleton and the non-treated control produced comparable results. Explanations for the failure of Bayleton to perform as expected include frequency of application (perhaps the product would have performed better when used every 2 weeks, rather than every 4 - 7 weeks). In addition, Bayleton has been heavily used at this golf course for summer patch control for several years, and it is possible, although by no means proven, that the particular strain of

summer patch present at this course has developed tolerance to Bayleton.

Based upon these results, a 30 day spray interval will provide excellent turfgrass quality and summer patch control using Heritage at 0.4 oz/1000 sq ft., and good to excellent results at the 0.2 oz/1000 sq ft rate. Although the turfgrass quality in the Lynx plots was not equivalent to the Heritage plots, control of summer patch was also good to excellent when Lynx at 1.5 oz/1000 sq ft was applied on a 30 day, or even a larger interval. Reasons for the reversible phytotoxicity observed in May and June should be explored further, as should the preliminary evidence that Lynx applications appeared to promote colonization by bentgrass.

Figure 3. Percent summer patch control at Arrowhead Country Club. Values were based on percent damage ratings, as described above. Points on the graph at each rating time that are associated with the same letter are not significantly different (Fisher's LSD, p<0.05).

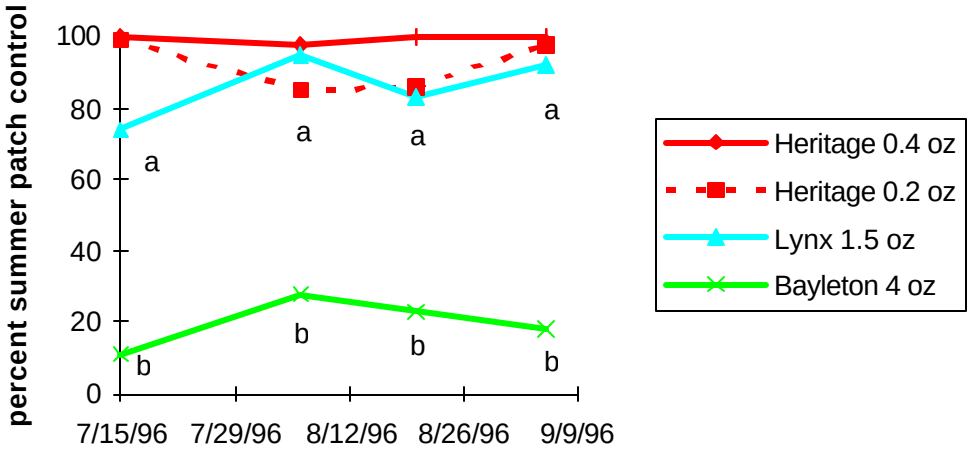



Table 1. Turfgrass quality ratings and summer patch control levels. Arrowhead Country Club, Green 15. Turf was rated on a scale of 0 - 9, and percent summer patch control was determined as described above. Reading vertically for a given date, ratings associated with the same letter are not significantly different (Fisher's LSD, p<0.05).

| | QUALITY RATINGS | | | | | | | PERCENT CONTROL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **TREATMENT** | 6/3 | 6/17 | 7/1 | 7/15 | 8/6 | 8/20 | 9/5 | 7/15 | 8/6 | 8/20 | 9/5 |
| 1) Heritage, 0.2 oz/1000 | 7.8a | 6.8a | 7.0a | 7.5a | 4.2b | 6.2a | 7.0b | 99a | 85a | 86a | 98a |
| 2) Heritage, 0.4 oz/1000 | 8.0a | 7.0a | 7.0a | 8.0a | 6.0a | 6.8a | 7.7a | 100a | 98a | 100a | 100a |
| 3) Bayleton, 4.0 oz/1000 | 7.7a | 7.0a | 6.3ab | 3.0c | 2.7c | 3.0b | 3.5d | 11b | 28b | 23b | 18b |
| 4) Lynx, 1.5 oz/1000 | 5.5b | 5.8ab | 7.0a | 4.7b | 5.5a | 6.2a | 6.2c | 74a | 95a | 83a | 92a |
| 5) Non-treated | 7.8a | 4.8b | 5.3b | 3.3bc | 2.3c | 2.5b | 3.0d | ___ | ___ | ___ | ___ |