**Annual Bluegrass Control in Fairway Height Creeping Bentgrass**

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## Introduction

This study was conducted on a mature stand of fairway height 'Penneagle II' creeping bentgrass (*Agrostis stolonifera*) and annual bluegrass (*Poa annua*) at the Valentine Turfgrass Research Center, Penn State University, University Park, PA. The objective of the study was to determine if selected materials could reduce the annual bluegrass population under simulated golf course fairway conditions.

## Methods and Materials

This study was a randomized complete block design with three replications. Treatments were applied on June 10 (POA), June 20 (10 DAT), June 24 (14 DAT), and July 2 (20 DAT), July 8 (28 DAT), July 11 (30 DAT), July 21 (40 DAT), July 23 (42 DAT), July 30 (50 DAT), August 11 (60 DAT), and August 22 (70 DAT) 2014 using a three foot $CO_2$ powered boom sprayer (Figure 1) calibrated to deliver 40 gpa using one, flat fan, TP9508EVS nozzle at 40 psi.

All plots were rated by recording the population of annual bluegrass prior to the application of any treatment, on a plot by plot basis. The rating was conducted by way of visual interpretation. This was repeated following the application of materials and a percent control of the population was produced.

At the initiation of the trial, the test site (Figure 2) consisted of approximately 60 percent creeping bentgrass and 40 percent annual bluegrass. The annual bluegrass population was visually evaluated on June 6 on a plot by plot basis, to determine the baseline population.

The test site was mowed at 0.5 inches 3 times per week with a John Deere Fairway mower with clippings collected. The test site was irrigated to prevent moisture stress and also received maintenance fungicide applications to control disease.

Data were analyzed with ARM 8.5.0 using Duncan's New MRT at the 0.5 percent significant level.

## Results and Discussion

Annual bluegrass phytotoxicity was rated nine times during the study (Table 1). Phytotoxicity was exhibited during the study. This would be expected as the objective was to eliminate the plant. Therefore, when phytotoxicity below acceptable was reported it was a statement to the degree of phytotoxicity. Included is a listing of the daily air temperatures for reference.

Creeping bentgrass phytotoxicity was rated three times during the study (Table 2). On the July 23rd rating date some treated turfgrass fell below the level of acceptability (3.0 or greater). It should be noted when the turfgrass was treated and subsequently rated and the air temperatures surrounding this time frame (Max/Min air temperatures attached). Between July 1st and the 23rd the high daily temperatures ranged between 71 and 86 degrees F.

Annual bluegrass control was rated six times during the study (Table 3.). The amount of control was variable during this study. On the final rating date September 8th, for this growing season, all treated turfgrass significantly revealed a reduction of the annual bluegrass populations when compared to non-treated turfgrass.

Although the dynamics of a mix annual bluegrass creeping bentgrass sward are evident in these data, this report should be considered preliminary. The true population change of the annual bluegrass will not be verified until a control rating is taken in the spring of 2015.

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A final spring rating of the annual bluegrass population change was rated on May 1, 2015 (Table 3). All treated turfgrass significantly reduced the annual bluegrass population compare to non-treated turfgrass. Although not statically significant, a trend was observed. Turfgrass treated with Xonerate applied four times may have a potential to decrease the annual bluegrass population compared to turfgrass treated with ARY-0452-110 applied eight times. Again, this is not statically significant but may be a trend to further explore. The exact active ingredient of ARY-0452-110 is unknown hence comparisons are moot at this point in the research. By the end of the study there was complete coverage of turf in all the plots (Figure 3).

**Table 1**. Evaluations of annual bluegrass phytotoxicity where 0 = no phytotoxicity, 3 = acceptable, and 10 = dead turf in 2014.

| Treatment | Rate | Timing | (----------Poa Phytotoxicity---------- | | | | | | | | ) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | oz/A | | 6/20 | 6/23 | 7/9 | 7/14 | 7/30 | 8/5 | 8/15 | 8/22 | 9/8 |
| Xonerate | 1.40 | POA/14/28/42 DAT | 1.00 | 1.00 | 1.00 | 5.70 | 5.00 | 6.70 | 6.30 | 8.70 | 1.00 |
| Xonerate Trimmit | 1.40 5.54 | POA/14/28/42 DAT | 1.00 | 4.70 | 1.70 | 6.00 | 5.50 | 5.70 | 1.00 | 1.00 | 1.00 |
| Untreated Check | | | 1.00 | 1.30 | 1.00 | 1.00 | 1.00 | 1.30 | 1.30 | 1.00 | 1.00 |
| ARY-0452-110 | 0.70 | POA10/20/30/40/50/60/70 DAT | 1.00 | 1.00 | 7.00 | 5.00 | 2.00 | 1.00 | 3.70 | 5.70 | 1.30 |
| ARY-0452-110 Trimmit | 0.70 5.54 | POA/10/20/30/40/50/60/70 DAT | 1.00 | 5.00 | 6.70 | 6.00 | 2.70 | 1.00 | 6.00 | 7.30 | 2.00 |

**Table 2**. Evaluations of 'Penneagle II' creeping bentgrass phytotoxicity where 0 = no phytotoxicity, 3 = acceptable, and 10 = dead turf in 2014.

| Treatment | Rate | Timing | (----------Bent Phytotoxicity-------) | | |
|---|---|---|---|---|---|
| | oz/A | | 6/20 | 6/23 | 7/23 |
| Xonerate | 1.40 | POA/14/28/42 DAT | 1.00 | 1.00 | 5.30 |
| Xonerate Trimmit | 1.40 5.54 | POA/14/28/42 DAT | 3.00 | 2.70 | 5.00 |
| Untreated Check | | | 1.00 | 1.00 | 1.00 |
| ARY-0452-110 | 0.70 | POA10/20/30/40/50/60/70 DAT | 1.00 | 1.00 | 2.30 |
| ARY-0452-110 Trimmit | 0.70 5.54 | POA/10/20/30/40/50/60/70 DAT | 2.00 | 3.00 | 2.70 |

**Table 3.** Percent control of annual bluegrass in a mixed simulated fairway height sward with 'Penneagle II' creeping bentgrass in 2014 and spring 2015.

| Treatment | Rate | Timing | (----------% Control [1]---------- | | | | | | ) |
|---|---|---|---|---|---|---|---|---|---|
| | oz/A | | 7/9 | 7/23 | 7/30 | 8/22 | 9/3 | 9/8 | 5/1/2015 |
| Xonerate | 1.40 | POA/14/28/42 DAT | 43.90 a | 48.40 a | 41.00 a | 40.70 a | 31.70 a | 44.40 a | 77.80 ab |
| Xonerate Trimmit | 1.40 5.54 | POA/14/28/42 DAT | 24.60 ab | 41.30 a | 15.10 ab | 10.30 a | 41.30 a | 20.60 a | 77.80 ab |
| Untreated Check | | | 0.00 b | 0.00 c | 0.00 c | 0.00 b | 0.00 b | 0.00 b | 0.00 c |
| ARY-0452-110 | 0.70 | POA10/20/30/40/50/60/70 DAT | 41.30 a | 38.10 a | 14.80 a | 34.40 a | 64.30 a | 54.80 a | 53.20 b |
| ARY-0452-110 Trimmit | 0.70 5.54 | POA/10/20/30/40/50/60/70 DAT | 46.80 a | 4.80 b | 4.80 b | 19.00 a | 57.10 a | 52.40 a | 83.30 a |

1 - Means followed by same letter do not significantly differ (P=0.05, Duncan's New MRT)