

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 May 31 (POA), June 7 (7 DAT), June 13 (14 DAT), and June 22, 2012 (21 DAT) using a three foot CO₂ powered boom sprayer (Figure 1) calibrated to deliver 80 gpa using one, flat fan, TP9508EVS nozzle at 40 psi.

Turfgrass was irrigated on an as needed basis to prevent moisture stress. The test area received maintenance fungicide applications to control disease.

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 May 31 on a plot by plot basis, to determine the baseline population and again on June 14, June 28, July 12, July 26, and August 23, 2012 to preliminarily evaluate a percent change of the population in each plot.

Results and Discussion

Annual bluegrass and creeping bentgrass phytotoxicity were rated six times during the study (Tables 1 and 2) No phytotoxicity was observed.

Turfgrass quality was rated six times during the study (Table 3). The quality rating included the following factors, turfgrass density, and uniformity of the turfgrass stand. All turfgrass had acceptable quality for the entire duration of the study. Similarly, turfgrass color never was rated below acceptable (Table 4).

Annual bluegrass control was rated five times during 2012 (Table 5). The amount of control was variable during this time. These ratings give some insight to the populations of annual bluegrass. In 2013 there were no significant differences found among treated turfgrass and non treated turfgrass (Table 6).

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Table 1. Evaluations of annual bluegrass phytotoxicity where 0 = dead turf, 7 = acceptable, and 10 = no phytotoxicity in 2012.

| Treatment | Form | Rate oz/A | Timing | Poa Phytotoxicity | | | | | |
|-----------|------|--------------|-----------------|-------------------|------|------|------|------|------|
| | | | | 5/31 | 6/7 | 6/13 | 6/22 | 6/29 | 7/6 |
| XONERATE | 70WG | 1.0 | POA | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| XONERATE | 70WG | 1.0 | POA/7 DAT | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| CHECK | | | | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| XONERATE | 70WG | 1.0 | POA/7/14 DAT | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| XONERATE | 70WG | 1.0 | POA/7/14/21 DAT | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |

Table 2. Evaluations of 'Penneagle II' creeping bentgrass phytotoxicity where 0 = dead turf, 7 = acceptable, and 10 = no phytotoxicity in 2012.

| Treatment | Form | Rate oz/A | Timing | Bent Phytotoxicity | | | | | |
|-----------|------|--------------|-----------------|--------------------|------|------|------|------|------|
| | | | | 5/31 | 6/7 | 6/13 | 6/22 | 6/29 | 7/6 |
| XONERATE | 70WG | 1.0 | POA | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| XONERATE | 70WG | 1.0 | POA/7 DAT | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| CHECK | | | | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| XONERATE | 70WG | 1.0 | POA/7/14 DAT | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| XONERATE | 70WG | 1.0 | POA/7/14/21 DAT | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |

Table 3. Evaluations of turfgrass quality where 0 = poor quality, 7 = acceptable, and 10 = excellent quality in 2012.

| Treatment | Form | Rate oz/A | Timing | Quality | | | | | |
|-----------|------|--------------|-----------------|---------|-----|------|------|------|-----|
| | | | | 5/31 | 6/7 | 6/13 | 6/22 | 6/29 | 7/6 |
| XONERATE | 70WG | 1.0 | POA | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 |
| XONERATE | 70WG | 1.0 | POA/7 DAT | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 |
| CHECK | | | | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 |
| XONERATE | 70WG | 1.0 | POA/7/14 DAT | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 |
| XONERATE | 70WG | 1.0 | POA/7/14/21 DAT | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 |

Table 4. Evaluations of turfgrass color where 0 = brown turf, 7 = acceptable, and 10 = dark green turf in 2012.

| Treatment | Form | Rate oz/A | Timing | Color | | | | | |
|-----------|------|--------------|-----------------|-------|-----|------|------|------|-----|
| | | | | 5/31 | 6/7 | 6/13 | 6/22 | 6/29 | 7/6 |
| XONERATE | 70WG | 1.0 | POA | 8.0 | 8.0 | 8.5 | 8.5 | 9.0 | 9.0 |
| XONERATE | 70WG | 1.0 | POA/7 DAT | 8.0 | 8.0 | 8.5 | 8.5 | 9.0 | 9.0 |
| CHECK | | | | 8.0 | 8.0 | 8.5 | 8.5 | 9.0 | 9.0 |
| XONERATE | 70WG | 1.0 | POA/7/14 DAT | 8.0 | 8.0 | 8.5 | 8.5 | 9.0 | 9.0 |
| XONERATE | 70WG | 1.0 | POA/7/14/21 DAT | 8.0 | 8.0 | 8.5 | 8.5 | 9.0 | 9.0 |

Table 5. Percent control of annual bluegrass in a mixed fairway height sward with 'Penneagle II' creeping bentgrass in 2012.

| Treatment | Form | Rate oz/A | Timing | % Control ¹ | | | | |
|-----------|------|--------------|-----------------|------------------------|------|--------|--------|--------|
| | | | | 6/14 | 6/28 | 7/12 | 7/26 | 8/23 |
| XONERATE | 70WG | 1.0 | POA | 0.0a | 0.0a | 12.6ab | 12.6bc | 12.6bc |
| XONERATE | 70WG | 1.0 | POA/7 DAT | 0.0a | 0.0a | 8.3bc | 8.3cd | 8.3cd |
| CHECK | | | | 0.0a | 0.0a | 0.0c | 0.0d | 0.0d |
| XONERATE | 70WG | 1.0 | POA/7/14 DAT | 0.0a | 0.0a | 11.2b | 22.4b | 22.4b |
| XONERATE | 70WG | 1.0 | POA/7/14/21 DAT | 0.0a | 0.0a | 22.7a | 34.3a | 45.8a |

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

Table 6. Percent control of annual bluegrass in a mixed fairway height sward with 'Penneagle II' creeping bentgrass in 2013.

| Treatment | Form | Rate oz/A | Timing | % Control ¹ |
|-----------|------|--------------|-----------------|------------------------|
| | | | | 5/6 |
| XONERATE | 70WG | 1.0 | POA | 4.2 a |
| XONERATE | 70WG | 1.0 | POA/7 DAT | 0.0a |
| CHECK | | | | 0.0a |
| XONERATE | 70WG | 1.0 | POA/7/14 DAT | 30.6 a |
| XONERATE | 70WG | 1.0 | POA/7/14/21 DAT | 22.2 a |

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



Figure 1: CO₂ powered boom sprayer used for application of liquid materials.



Figure 2: Overview of the testing area. Photo taken 8/24/2012