UNIVERSITY OF CALIFORNIA
UC RIVERSIDE

# Control of Annual Bluegrass in Creeping Bentgrass Putting Greens in Southern Nevada

Pawel Orlinski and Jim Baird
Department of Botany and Plant Sciences
University of California, Riverside
*Contact: pawel.orlinski@ucr.edu*

Research Report Brought To You By:

UCR | Turfgrass Science

CA TURFGRASS & LANDSCAPE FOUNDATION
"Keeping California Green and Growing"

Southern Nevada Chapter GCSAA
GOLF COURSE SUPERINTENDENTS ASSOCIATION OF AMERICA

## The Bottom Line:

Three herbicides comprising eight treatments were tested against an untreated control for their ability to selectively control annual bluegrass (Poa annua) in a creeping bentgrass putting green at Anthem Country Club in Henderson, NV. While none of the herbicides provided complete control during the first year of the study, plots treated with PoaCure showed dramatic reduction in Poa, especially following both spring and fall applications. On the other hand, both spring and fall applications of PoaCure resulted in rapid reduction of Poa cover and created voids in the turf before bentgrass could fill in. Plots treated with higher rates of cumyluron also significantly reduced annual bluegrass cover, but to a lesser extent than PoaCure. Cumyluron exhibited more preemergence activity as annual bluegrass cover increased only minimally in plots treated with this herbicide while annual bluegrass cover almost doubled in untreated plots between February 2020 and June 2021. Bensumec did not significantly reduce Poa populations in either year of the study.

## Introduction

Annual bluegrass (*Poa annua*) is the most ubiquitous turfgrass species in the world. Often managed as a turf by default due to widespread distribution in climates represented by California and Nevada, annual bluegrass is also one of, if not the world's most serious turfgrass weeds in part because it is extremely susceptible to most biotic and abiotic stresses, often resulting in sudden death. Thus, more pesticides are used on annual bluegrass to eradicate or help keep it alive than any other turfgrass species. If the turfgrass industry had both an effective and selective means of maintaining *Poa*-free turf, then far fewer pesticides would be needed for managing turfgrasses. Currently, few herbicides are registered for pre- and postemergence control of annual bluegrass in creeping bentgrass (*Agrostis stolonifera*) putting greens in the United States. PoaCure (methiozolin) was recently registered in Nevada most of the U.S., but not yet in California. Additional information about proper timing is warranted in high desert climates like Las Vegas. Cumyluron from Marubeni Corp. (Japan) is under development in the U.S. Additional data are needed to satisfy Federal and State registrations.

## Objectives

Following unconditional registration of PoaCure in December 2019 this study was conducted to determine best timing for herbicide application in Southern Nevada to maximize control of annual bluegrass while minimizing injury to creeping bentgrass in a high desert climate.

## Materials and Methods

The study was conducted at the Anthem Country Club in Henderson, NV on a creeping bentgrass 'Dominant+' chipping green (elevation 2,690 ft). Treatments were arranged in

randomized complete block design and replicated four times. Plot size was 4 x 6 ft with 2-ft alleys. Herbicide treatments were applied using a $CO_2$-powered hand boom sprayer equipped with TeeJet 8002VS nozzles and output of 1 gal/M and watered in immediately following application.

Plots were evaluated every 2 to 4 weeks for annual bluegrass cover (0-100%). When visible, injury to annual bluegrass and creeping bentgrass were also evaluated. Starting in April 2021, voids left after rapid annual bluegrass dieback was estimated visually. For clarity of presentation, data were combined by month and subjected to analysis of variance (ANOVA). When necessary, multiple comparisons of means were assessed using Tukey's honest significant difference test at the 0.05 probability level.

## Results

None of the herbicide treatments caused injury to creeping bentgrass throughout the study period (data not shown). Annual bluegrass cover on the study area ranged from ca. 30-60% at the beginning of the experiment (Table 2). The climate at Anthem Country Club provided ideal conditions for annual bluegrass proliferation as was observed in the untreated control plots, which almost doubled in Poa cover within one year from the start of the study (Tables 2 and 3). Of all treatments tested, PoaCure provided the best Poa control. While it is still too early to determine the best application timing, it seems that better or faster control was achieved by fall applications compared to spring applications of PoaCure. By June 2021, there were no significant differences among all PoaCure treatments. However, only five fall applications were made for treatment 8, whereas a total of ten applications were made for treatment 7 over two years. Even better control was obtained by both spring and fall applications of PoaCure (treatment 9), which maintained Poa cover below 15% (Tables 1-3). PoaCure typically provides slow, seamless control of Poa in creeping bentgrass greens. However, in this study some of the Poa biotypes died back at an accelerated rate, which created voids in the turf before bentgrass was able to fill in (Table 4). This was most pronounced when PoaCure was applied in both spring and fall (Table 5). Previous research conducted by our team has showed that PoaCure, while not causing long lasting injury to creeping bentgrass, can suppresses bentgrass growth leading to slower regeneration.

In comparison to PoaCure, which has stronger postemergence but also preemergence activity, both cumyluron and Bensumec possess primarily preemergence activity, which explains why their postemergence control was less effective considering initial Poa populations on the green. Nevertheless, cumyluron applied at either 6 or 12 oz/M provided significant reduction of Poa compared to the untreated control (Tables 2 and 3). Furthermore, all rates of cumyluron and Bensumec reduced Poa populations over time although not often significantly different from the control. These treatments usually had less visible injury on annual bluegrass with the

exception of June 2021, which was likely connected to a heat wave that occurred in the beginning of the month (Tables 4 and 5; Figures 1 and 3).

## Acknowledgments

Thanks to James Symons, superintendent of Anthem Country Club, for hosting this research, and the Southern Nevada Chapter of the Golf Course Superintendents Association of America (SNGCSAA), California Turfgrass & Landscape Foundation (CTLF), Moghu USA, and Marubeni Corporation for financial and product support for this study.

## Tables and Figures

Table 1. Herbicide treatments tested against annual bluegrass at Anthem Country Club, Henderson, NV. 2020-21.

| Treatment | Rate | Timing |
|---|---|---|
| 1 Untreated Control | | |
| 2 Cumyluron | 1.5 oz/M | A G K |
| 3 Cumyluron | 3 oz/M | A G K |
| 4 Cumyluron | 6 oz/M | A G K |
| 5 Cumyluron | 12 oz/M | A G K |
| 6 Bensumec | 9.4 oz/M | A G K |
| 7 PoaCure - Spring | 0.6 oz/M | ABCDE KLMNO |
| 8 PoaCure - Fall | 0.6 oz/M | FGHIJ |
| 9 PoaCure - Spring and Fall | 0.6 oz/M | ABCD FGHI KLMN |

Application codes (timing):

A- 2/25/2020; B - 3/10/2020; C - 3/24/2020; D - 4/7/2020; E 4/21/2020

F - 10/7/2020; G - 10/22/2020; H - 11/4/2020; I - 11/18/2020; J - 12/2/2020

K - 2/24/2021; L - 3/12/2021; M - 3/26/2021; N - 4/9/2021; O - 4/23/2021

Table 2. Effects of herbicides on annual bluegrass cover (0-100%) at Anthem Country Club, Henderson. NV. 2020.

| | Poa Cover (%) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2020 | | | | | | | | |
| Treatment | Mar | Apr | May | Jun | Jul | Aug | Oct | Nov | Dec |
| 1 Untreated Control | 58 a | 58 a | 79 a | 82 a | 84 a | 74 a | 79 a | 94 a | 83 a |
| 2 Cumyluron (1.5 oz/M) | 63 a | 62 a | 52 b | 75 a | 68 a | 66 a | 61 a | 79 a | 70 a |
| 3 Cumyluron (3 oz/M) | 46 a | 55 a | 42 bc | 55 ab | 55 ab | 50 ab | 61 a | 78 a | 66 ab |
| 4 Cumyluron (6 oz/M) | 38 a | 41 ab | 32 c | 34 bc | 29 bc | 26 bc | 28 bc | 49 b | 38 bc |
| 5 Cumyluron (12 oz/M) | 44 a | 35 abc | 23 cd | 26 bc | 28 bc | 20 bc | 17 c | 39 b | 35 cd |
| 6 Bensumec (9.4 oz/M) | 62 a | 64 a | 81 a | 78 a | 80 a | 72 a | 65 a | 78 a | 76 a |
| 7 PoaCure (0.6 oz/M) Spring | 38 a | 6 c | 7 d | 10 c | 14 c | 6 c | 11 c | 32 bc | 13 cde |
| 8 PoaCure (0.6 oz/M) Fall | 30 a | 39 abc | 56 b | 59 ab | 61 a | 49 ab | 38 b | 29 bc | 8 de |
| 9 PoaCure (0.6 oz/M) Spring and Fall | 55 a | 8 bc | 7 d | 12 c | 11 c | 10 c | 14 c | 15 c | 1 e |
| p-value | 0.0289 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

* Means followed by the same letter in a column are not significantly different (P=0.05).

Table 3. Effect of herbicides on annual bluegrass cover (0-100%) at Anthem Country Club, Henderson. NV. 2021.

| | Poa Cover (%) | | | | | |
|---|---|---|---|---|---|---|
| | 2021 | | | | | |
| Treatment | Jan | Feb | Mar | Apr | May | Jun |
| 1 Untreated Control | 82 a | 89 a | 83 a | 86 a | 85 a | 89 a |
| 2 Cumyluron (1.5 oz/M) | 73 a | 73 ab | 71 ab | 70 ab | 67 ab | 68 abc |
| 3 Cumyluron (3 oz/M) | 61 ab | 71 ab | 67 ab | 68 abc | 70 ab | 59 abc |
| 4 Cumyluron (6 oz/M) | 38 bc | 47 b | 45 bc | 42 c | 42 bc | 34 cd |
| 5 Cumyluron (12 oz/M) | 25 cd | 47 b | 57 ab | 46 bc | 38 c | 44 bc |
| 6 Bensumec (9.4 oz/M) | 75 a | 82 a | 81 a | 84 a | 72 a | 76 ab |
| 7 PoaCure (0.6 oz/M) Spring | 12 cd | 16 c | 16 cd | 6 d | 2 d | 3 d |
| 8 PoaCure (0.6 oz/M) Fall | 0 d | 0 c | 0 d | 0 d | 2 d | 4 d |
| 9 PoaCure (0.6 oz/M) Spring and Fall | 0 d | 0 c | 0 d | 0 d | 1 d | 2 d |
| p-value | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

* Means followed by the same letter in a column are not significantly different (P=0.05).

Table 4. Annual bluegrass injury caused by herbicides at Anthem Country Club, Henderson, NV. 2020-21.

| | Poa Injury (%) | | | | | |
|---|---|---|---|---|---|---|
| | 2020 | | 2021 | | | |
| Treatment | Mar | Apr | Mar | Apr | May | Jun |
| 1 Untreated Control | 2 b | 0 c | 0 b | 0 b | 0 b | 0 b |
| 2 Cumyluron (1.5 oz/M) | 1 b | 5 c | 0 b | 1 b | 0 b | 28 ab |
| 3 Cumyluron (3 oz/M) | 4 b | 5 c | 0 b | 2 b | 1 b | 20 ab |
| 4 Cumyluron (6 oz/M) | 5 b | 21 b | 0 b | 1 b | 3 b | 28 ab |
| 5 Cumyluron (12 oz/M) | 5 b | 34 b | 0 b | 1 b | 5 b | 55 a |
| 6 Bensumec (9.4 oz/M) | 5 b | 2 c | 0 b | 0 b | 0 b | 12 ab |
| 7 PoaCure (0.6 oz/M) Spring | 31 a | 95 a | 0 b | 40 a | 46 a | 0 b |
| 8 PoaCure (0.6 oz/M) Fall | 0 b | 0 c | 22 a | 0 b | 10 ab | 0 b |
| 9 PoaCure (0.6 oz/M) Spring and Fall | 35 a | 96 a | 11 ab | 12 b | 12 ab | 0 b |
| p-value | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0027 | 0.0265 |

* Means followed by the same letter in a column are not significantly different (P=0.05).

Table 5. Effects of herbicides on bareground cover (0-100%) following rapid dieback of annual bluegrass at Anthem Country Club, Henderson. NV. 2021.

| Voids in Turf (%) | | | |
|---|---|---|---|
| | 2021 | | |
| Treatment | Apr | May | Jun |
| 1 Untreated Control | 0 b | 1 c | 0 b |
| 2 Cumyluron (1.5 oz/M) | 0 b | 1 c | 0 b |
| 3 Cumyluron (3 oz/M) | 0 b | 0 c | 0 b |
| 4 Cumyluron (6 oz/M) | 1 b | 0 c | 0 b |
| 5 Cumyluron (12 oz/M) | 0 b | 1 c | 0 b |
| 6 Bensumec (9.4 oz/M) | 0 b | 2 bc | 0 b |
| 7 PoaCure (0.6 oz/M) Spring | 4 b | 11 ab | 0 b |
| 8 PoaCure (0.6 oz/M) Fall | 9 ab | 4 bc | 0 ab |
| 9 PoaCure (0.6 oz/M) Spring and Fall | 15 a | 15 a | 2 a |
| p-value | 0.0000 | 0.0000 | 0.0220 |

* Means followed by the same letter in a column are not significantly different (P=0.05).

Figure 1. Annual bluegrass pressure at Anthem Country Club, Henderson, NV. Note reduced pressure from 12 oz/M cumyluron (treatment 5; middle) surrounded by untreated control (left) and PoaCure applied in spring (treatment 7; right). Photo taken on June 18, 2021.

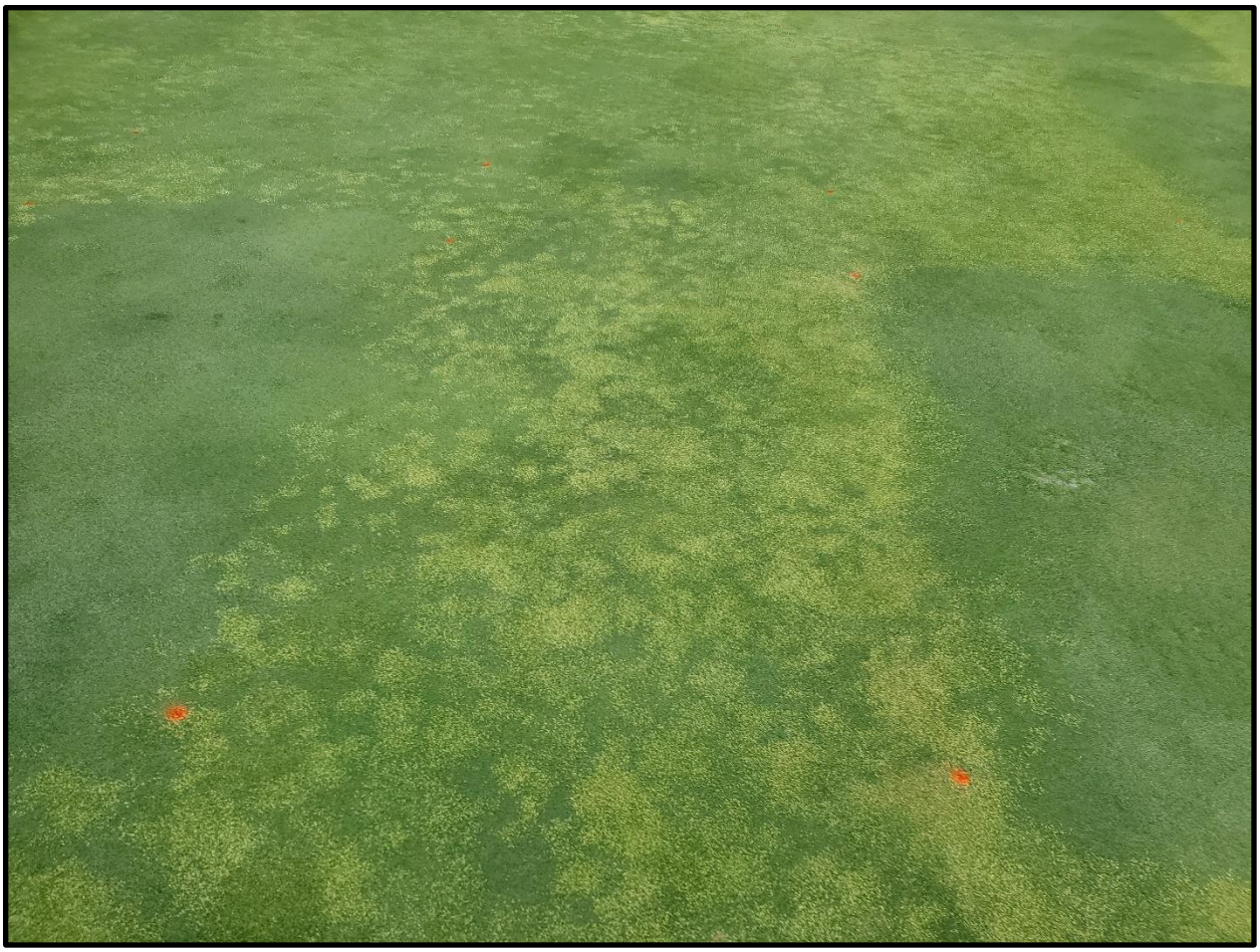

Figure 2. Annual bluegrass pressure at Anthem Country Club, Henderson, NV. Two PoaCure treatments 8 (left) and 9 (right) surrounding untreated control plot (middle). Photo taken on June 18, 2021.


Figure 3. Annual bluegrass pressure at Anthem Country Club, Henderson, NV. PoaCure treatments 7-9 provided nearly 100% annual bluegrass control. Note Poa control from cumyluron applied at 6 oz/M (4) vs. cumyluron applied at 1.5 oz/M (2). Photo taken on June 18, 2021.