

Evaluation of Herbicides to Provide Control and Seed Head Suppression of Creeping Bentgrass, 2014

Marvin Butler and Jeff Lowe

Abstract

Glyphosate tolerant creeping bentgrass (*Agrostis stolonifera* L.) accidentally escaped from production fields in 2003 and is now found growing along irrigation ditches in Jefferson County. During 2014 three research projects were conducted at the Central Oregon Agricultural Research Center (COARC) to evaluate herbicide control of plants of various size, potential new herbicide options and varied approaches to seed head suppression. Poast provided greater control than Finale whether plants were grown from 2-inch, 4-inch or 6-inch plugs, with the greatest efficacy on the smallest plants. When applied alone Accord provided 100 percent control, Topramezone provided 81 percent control and Sonar provided 63 percent control. The combination of Topramezone plus Sonar provided 94 percent control. Seed head suppression was best achieved with a propane flamer at either boot stage or flowering.

Introduction

In 2003, glyphosate tolerant creeping bentgrass (*Agrostis stolonifera* L.) accidentally escaped from production fields, and is now found growing along irrigation ditches in Jefferson County, Oregon. A mitigation program has been implemented to control and ultimately eradicate these plants. Since plants are growing along irrigation ditches, herbicide options for control are limited. A 24 C label allows the use of Finale (glufosinate) and Poast (sethoxydim) for creeping bentgrass in dry irrigation canals and drainage ditches, limiting herbicide applications to early spring and late fall. The three objectives of this study were: 1) conduct a second year of research to evaluate the efficacy of products currently registered or having that potential, 2) evaluate new herbicide options for efficacy that might provide improved control over those previously evaluated, 3) conduct a second year of research to evaluate various approaches to seed head suppression.

Material and Methods

Three research projects were conducted at the Central Oregon Agriculture Research Station (COARC) at Madras, Oregon during 2014. Creeping bentgrass control plots 10 ft x 15 ft were planted with 4 creeping bentgrass plugs placed 4 feet apart forming a square at the center of each plot. Plots were replicated four times in a randomized complete block design. Treatments were applied on a percent v/v basis with a hand sprayer until the plant was fully wet.

The first project evaluated efficacy of Finale, Poast and Reward (diquat) in combination with AMS (ammonium sulfate) and/or COC (crop oil concentrate), and Ortho Elementals (soy oil) applied alone to creeping bentgrass plants started as 2-inch, 4-inch and 6-inch plugs. Treatments were applied June 13. Visual ratings of percent control were made on July 18 thirty-five days after treatment (35 DAT) and September 29 (108 DAT).

The second project evaluated Accord (glyphosate), Reward, Sonar (fluridone), Topramezone (topramezone) and Aquathol (endothall) applied alone and the following combinations, Accord + Sonar, Sonar + Topramezone, Sonar + Aquathol, Topramezone + Aquathol. Class Act NC was added to all treatments and applied as a stand-alone treatment. Treatments were applied on July 10. Visual ratings of percent control were made on August 14 (35 DAT) and September 29 (81 DAT).

The third project focused on seed head suppression. Plots were composed of two 2 ft x 2 ft sub-plots marked out with paint in an existing planting of creeping bentgrass. Plots were replicated four times and randomized within the plot area. Treatments include Reward + AMS, Ortho Elementals and propane flaming applied at boot stage on June 5 and at flowering on June 24. Plants were flamed to remove foliage back to the crown. Visual ratings of percent control of seed head formation were made on July 15, 40 DAT at boot stage and 21 DAT at heading. Subsequent visual observations did not reveal any change in ratings.

Results and Discussion

Results from the first project indicate that product efficacy was affected by plant size, with the greatest efficacy on the smallest plants (Table 1). While Finale appeared to provide 79 to 98 percent control 35 DAT, due to regrowth efficacy dropped to 0 to 25 percent at 108 DAT. Poast provided the greatest control at 92 to 99 percent 35 DAT and ranged from 81 to 100 percent control 108 DAT. No control was provided by Reward or Ortho Elementals.

Results from herbicides applied alone in the second project showed 100 percent control using Accord, 81 percent control with Topramezone and 63 percent control from Sonar when evaluated 81 DAT (Table 2). A slight increase in efficacy was observed for Accord (98 to 100 percent) from 35 to 81 DAT. Regrowth following treatment reduced efficacy for Sonar from 76 percent to 63 percent and for Topramezone from 95 percent to 81 percent. No efficacy against creeping bentgrass was observed for Reward, Aquathol or Class Act NG applied alone.

The combination of Accord + Sonar provided 100 percent control, similar to Accord applied alone. Combination treatments with Topramezone plus Sonar increased efficacy to 94 percent, while Aquathol did not increase efficacy beyond Topramezone applied alone at 81 percent control when evaluated 81 DAT. Aquathol provided no control when applied alone, but when applied in combination with Sonar efficacy appears to have been increased (96 and 88 percent) beyond application of Sonar alone (76 and 63 percent). This may be an anomaly and would need additional research to decipher the situation.

Seed head suppression was best achieved with a propane flamer to reduce foliage down to the crown at either boot stage or flowering. Seed head suppression with Ortho Elementals was more effective at boot stage (96 percent) than flowering (85 percent), while Award was more effective at flowering (90 percent) than boot stage (75 percent).

Table 1. Efficacy of herbicides applied to creeping bentgrass on June 13 and visually rated for percent control on July 18 (35 DAT) and September 29 (108 DAT).

Plant Size	Treatment	Application Rate	Percent Bentgrass Control	
			July 18	September 29
<i>2-Inch</i>	Finale + AMS	3% v/v + 1% v/v	98 a	25 b
	Poast + AMS + COC	1.5% v/v + 1% v/v + 1% v/v	99 a	100 a
	Reward + COC	0.5% v/v + 1% v/v	0 e	0 b
	Ortho Elementals	100% v/v	0 e	0 b
	Untreated	-----	0 e	0 b
<i>4-Inch</i>	Finale+AMS	3% v/v + 1% v/v	79 d	0 b
	Poast + AMS + COC	1.5% v/v + 1% v/v + 1% v/v	95 ab	81 a
	Reward + COC	0.5% v/v + 1% v/v	0 e	0 b
	Ortho Elementals	100% v/v	0 e	0 b
	Untreated	-----	0 e	0 b
<i>6-Inch</i>	Finale + AMS	3% v/v + 1% v/v	85 cd	0 b
	Poast + AMS + COC	1.5% v/v + 1% v/v + 1% v/v	92 bc	81 a
	Reward + COC	0.5% v/v + 1% v/v	0 e	0 b
	Ortho Elementals	100% v/v	0 e	0 b
	Untreated	-----	0 e	0 b

Statistical analysis using Tukey's test ($P < 0.05$).

Table 2. Efficacy of herbicides applied to creeping bentgrass on July 10 and visually rated for percent control on August 14 (35 DAT) and September 29 (81 DAT).

Treatment	Application Rate	Percent Bentgrass Control	
		August 14	September 29
<i>Single Products:</i>			
Accord ¹	1% v/v	98 ab	100 a
Reward	1% v/v	0 c	0 b
Sonar	1% v/v	76 b	63 a
Topramezone	1% v/v	95 ab	81 a
Aquathol	1% v/v	0 c	0 b
Class Act NG	5% v/v	0 c	0 b
<i>Combinations:</i>			
Accord + Sonar	1% v/v + 1% v/v	100 a	100 a
Sonar + Topramezone	1% v/v + 1% v/v	94 ab	94 a
Sonar + Aquathol	1% v/v + 1% v/v	96 ab	88 a
Topramezone + Aquathol	1% v/v + 1% v/v	94 ab	81 a
Untreated	-----	0 c	0 b

¹Class Act NG applied all treatments at 5% v/v. Statistical analysis using Tukey's test ($P < 0.05$).

Table 3. Efficacy of treatments for seed head suppression of creeping bentgrass applied at boot stage (June 5) or flowering (June 23), with visual ratings for percent seed head control on July 15, 40 DAT at boot stage and 21 DAT at flowering.

Applic. Timing	Treatment	Application Rate	Percent Seed Head Suppression
<i>Boot Stage</i>	Reward + AMS	0.5% v/v + 1% v/v	75 d
	Ortho Elementals	100% v/v	96 b
	Propane	Burn foliage to crown	100 a
<i>Flowering</i>	Reward + AMS	0.5% v/v + 1% v/v	90 c
	Ortho Elementals	100% v/v	85 c
	Propane	Burn foliage to crown	100 a
	Untreated	-----	0 e

Statistical analysis using Tukey's test ($P < 0.05$).

Acknowledgments

The author would like to thank Jeff Lowe with Scotts Company for their support of this project. Thanks to Jeremiah Dung for statistical analysis of the data.