

Evaluation of Products for Control of Rogue Bentgrass (*Agrostis* spp.) and Annual Bluegrass (*Poa annua*) in Fine Fescue Fairways.

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Introduction

The ongoing six-year drought in California continues to emphasize the importance of water conservation and the thoughtful use of all natural resources in the maintenance of turfgrass systems.

The fine fescue species including hard fescue (*Festuca longifolia* or *duriuscula*), Chewings fescue (*Festuca rubra* subsp. *commutata*), (blue) sheep fescue (*Festuca ovina*), creeping red fescue (*Festuca rubra* subsp. *rubra*), and slender creeping red fescue (*Festuca rubra* subsp. *litoralis*) exhibit some of the lowest water use rates of all cool season grasses. This fine textured turfgrass is well adapted to cool Mediterranean microclimates in the coastal areas of Central Coast and Northern California. Fine fescues are often blended and used successfully as a stand-alone turf type where traffic is moderate or can be utilized in mixtures with other cool season grasses such as perennial ryegrass and Kentucky bluegrass.

Unfortunately, rogue bentgrass types and annual bluegrass (*Poa annua*) are frequent contaminants of fine fescue resulting in small and large patches of aggressively growing turf types that differ greatly in color, texture and visual appearance. If left unchecked, these rapidly growing patches of rogue bentgrass and *Poa annua* will persist and over time expand in size, greatly reducing visual uniformity, aesthetics, playability and surface quality of fine fescue fairways and rough areas.

The objectives of this replicated field trial were as follows:

1. to evaluate products for enhanced suppression and control of rogue bentgrass and *Poa annua*, and safe use on fine fescue fairways, when applied as multiple sequential applications, and

2. to utilize this information in the development of a practical agronomic program for the suppression and control of rogue bentgrass and *Poa annua* in fine fescue turf stands.

Materials & Methods

The field study was conducted from July 2 to December 22, 2014 in a fairway area on the seventeenth hole at the California Golf Club located in South San Francisco, California. The fine fescue grass stand consisted of a well-maintained three-way mixture of SR5250 creeping red fescue, SR5130 chewings fescue and SeaLink slender creeping red fescue with a plot average of 19.6% bentgrass and 23.5% *Poa annua* cover.

The site was mowed two to three times per week depending on the season at a cutting height of 0.400 inches and irrigated to avoid moisture stress. Soil was classified as sand to loamy sand. This area is characterized as a true Mediterranean climate with moderate summers and moderate to cool winters.

Treatments were deployed as presented in Table 1. The first application was deployed on July 2, 2014. The spray interval for sequential applications was treatment specific and deployed at 21, 28 or 42-day intervals. At 12:08 pm on the afternoon of the first application, the soil temperature registered 73.3° F at a depth of three inches with an air temperature of 70.8° F.

Plots measured 10' x 10' with 5' x 10' treatment plots directly adjacent to 5' x 10' in-plot check plots. This plot orientation allows for side-by-side comparison of treated versus untreated areas and aids in the identification of subtle treatment effects. Treatments were replicated four times.

A calibrated CO₂ propelled spray system pressurized to 28 psi and equipped with four 11008LP Tee-Jet nozzles applied liquid treatments at a spray volume of 1.5 gallons per thousand square feet (1000 ft²). A pacing watch was used for spray applications to ensure uniform and accurate delivery. The field plot was not mowed for 24 hours prior to application and was not mowed for 48 hours after application.

Fine fescue injury, percent bentgrass and *Poa annua* cover, and calculated percent bentgrass and *Poa annua* control were evaluated. Fine fescue injury was rated on a 0-100 scale with 0 representing no injury, 30 a maximum level of acceptable injury and 100 dead turf.

Percent creeping bentgrass and *Poa annua* cover were visually estimated on a 0-100% scale. Percent creeping bentgrass and *Poa annua* control were statistically calculated based on the change in percent cover of treatments versus the untreated check plot. Data were summarized and statistically analyzed. Differences between means were determined via LSD.

Table 1. Treatment application schedule at the California Golf Club. S. San Francisco, CA. Mahady & Assoc., Inc.

<u>Treatments</u>	<u>Rate</u>	<u>Application Frequency & Interval</u>	<u>Application Schedule</u>
1) Untreated Check	*	*	*
2) Tenacity ¹ + NIS ²	5 oz/A + 0.25% v/v	3x: 21-day interval	7/2, 7/23, 8/13/14
3) Tenacity + Turflon ³ + NIS	5 oz/A + 8 oz/A + 0.25% v/v	3x: 21-day interval	7/2, 7/23, 8/13/14
4) Tenacity + Turflon + NIS	5 oz/A + 16 oz/A + 0.25% v/v	3x: 21-day interval	7/2, 7/23, 8/13/14
5) Xonerate 4SC ⁴	2.8 oz/A	3x: 21-day interval	7/2, 7/23, 8/13/14
6) Tenacity + Xonerate	5 oz/A + 1.4 oz/A	3x: 21-day interval	7/2, 7/23, 8/13/14
7) Tenacity + Xonerate	5 oz/A + 2.8 oz/A	3x: 21-day interval	7/2, 7/23, 8/13/14
8) SZ Southerm ⁵ + QuickSilver ⁶	5 pt/A + 2.7 oz/A	3x: 21-day interval	7/2, 7/23, 8/13/14
9) SZS + QuickSilver + Turflon	5 pt/A + 2.7 oz/A + 8 oz/A	3x: 21-day interval	7/2, 7/23, 8/13/14
10) Grass-Getter ⁷	0.2 oz/M	3x: 21-day interval	7/2, 7/23, 8/13/14
11) Fusilade ⁸ + NIS	16 oz/A + 0.5% v/v	2x: 28-day interval	9/24, 10/22/14
12) GF-142 + MSO ⁹	0.044 lb/A + 24 oz/A	3x: 6-week intervals	7/2, 8/13, 9/24/14
13) GF-142 + MSO	0.066 lb/A + 24 oz/A	3x: 6-week intervals	7/2, 8/13, 9/24/14
14) GF-142 + MSO	0.088 lb/A + 24 oz/A	3x: 6-week intervals	7/2, 8/13, 9/24/14
15) Roundup Pro ¹⁰	3 oz/A	3x: 21-day interval	7/9, 7/30, 8/20/14

¹ Mesotrione
² Activator 90
³ Triclopyr
⁴ Amicarbazone
⁵ 2,4-D, MCPP, Dicamba, Carfentrazone
⁶ Carfentrazone
⁷ Sethoxydim
⁸ Fluazifop
⁹ Methylated Seed Oil
¹⁰ Glyphosate

Key Results and Discussion

◆ Treatment Effects on Fine Fescue Injury (Table 2)

- The most severe and highly unacceptable injury was observed with Treatment 7, Tenacity 5 oz/A + Xonerate 2.8 oz/A, Treatment 6, Tenacity 5 oz/A + Xonerate 1.4 oz/A, Treatment 5, Xonerate 2.8 oz/A and Treatment 4, Tenacity 5 oz/A + Turflon 16 oz/A. Differences were statistically significant when compared to the untreated check. It is hypothesized that within these tank mix combinations, Xonerate (amicarbazone) and Turflon (triclopyr) were the individual active ingredients which contributed most significantly to this increasing injury.
- The severity of the fine fescue injury in Treatments 4, 5, 6 and 7 would completely negate the potential use of these treatments in fine fescue fairways, regardless of their potential to control bentgrass or *Poa annua*.

Table 2. Treatment effects on fine fescue injury. California Golf Club. 2014. Mark M. Mahady & Associates, Inc.

Treatments	Fescue Injury¹ 7/9/14 7DAA1²	Fescue Injury 7/23/14 21DAA1	Fescue Injury 8/13/14 21DAA2	Fescue Injury 8/20/14 7DAA3	Fescue Injury 9/3/14 21DAA3	Fescue Injury 9/24/14 42DAA3	Fescue Injury 10/1/14 49DAA3	Fescue Injury 10/22/14 70DAA3	Fescue Injury 11/21/14 100DAA3	Fescue Injury 12/22/14 131DAA3
1 Untreated Check	0.0 b ³	0.0 b	0.0 c	0.0 f	0.0 d	0.0 d	0.0 c	0.0 b	0.0 b	0.0 a
2 Tenacity 5 oz/A	0.0 b	0.0 b	16.3 bc	23.3 de	11.3 d	0.0 d	0.0 c	0.0 b	0.0 b	0.0 a
3 Tenacity+Turflon 5+8 oz/A	0.0 b	0.0 b	10.5 bc	19.5 def	34.8 c	11.3 d	1.3 c	7.5 b	6.3 b	0.0 a
4 Tenacity+Turflon 5+16 oz/A	0.0 b	14.5 a	33.5 b	39.5 bc	49.0 bc	27.5 c	13.8 c	10.8 b	8.5 b	0.0 a
5 Xonerate 2.8 oz/A	1.3 b	6.3 b	21.8 bc	31.0 cd	44.3 bc	32.5 c	17.3 c	10.0 b	5.0 b	0.0 a
6 Tenacity+Xon 5+ 1.4 oz/A	0.0 b	6.0 b	30.0 bc	47.8 d	60.0 b	61.3 b	41.3 b	17.5 b	9.3 b	0.0 a
7 Tenacity+Xon 5+ 2.8 oz/A	5.5 a	14.0 a	56.0 a	82.5 a	90.0 a	87.8 a	83.0 a	72.8 a	71.3 a	5.0 a
8 SZS+QS 5 pt+2.7 oz/A	1.3 b	0.0 b	0.0 c	0.0 f	0.0 d	0.0 d	0.0 c	0.0 b	0.0 b	0.0 a
9 SZS+QS+Tf 5 pt+2.7+8 oz/A	0.8 b	1.3 b	3.8 bc	10.0 ef	7.5 d	0.0 d	5.0 c	6.3 b	5.0 b	0.0 a
10 Grass-Getter 0.2 oz/M	1.3 b	1.3 b	5.0 bc	1.5 f	0.0 d	0.0 d	0.0 c	0.0 b	0.0 b	0.0 a
Treatments	****	****	****	****	****	DOA1	7DAA1	DOA2	30DAA2	61DAA2
11 Fusilade 16 oz/A	0.0 b	0.0 b	0.0 c	0.0 f	0.0 d	0.0 d	0.0 c	0.0 b	0.0 b	0.0 a
Treatments	7DAA1²	21DAA1	DOA2	7DAA2	21DAA2	DOA3	7DAA3	28DAA3	58DAA3	89DAA3
12 GF-142 0.044 lb/A	0.0 b	0.0 b	14.5 bc	0.0 f	0.0 d	0.0 d	2.5 c	0.0 b	0.0 b	0.0 a
13 GF-142 0.066 lb/A	0.0 b	0.0 b	11.0 bc	0.0 f	0.0 d	0.0 d	3.8 c	0.0 b	0.0 b	0.0 a
14 GF-142 0.088 lb/A	0.0 b	0.0 b	8.8 bc	0.0 f	0.0 d	0.0 d	3.8 c	0.0 b	0.0 b	0.0 a
Treatments	DOA1	14DAA1	14DAA2	DOA3	14DAA3	35DAA3	42DAA3	63DAA3	93DAA3	124DAA3
15 Roundup Pro 3 oz/A	0.0 b	0.0 b	0.0 c	0.0 f	7.0 d	5.0 d	3.8 c	0.0 b	0.0 b	0.0 a
LSD (P=.05)	2.89	4.84	18.01	12.67	14.26	14.62	14.08	13.87	9.69	3.69
Standard Dev.	2.02	3.39	12.60	8.87	9.98	10.23	9.85	9.71	6.78	2.58
CV	303.67	117.43	89.58	52.16	49.27	68.12	84.31	116.72	96.64	774.6

¹ Fine fescue injury: 0-100 scale with 0 representing no injury, 30 a maximum level of acceptable injury and 100 dead turf.
² Days after application one.
³ Means followed by the same letter do not differ significantly (P=0.05, Student-Newman-Keuls).

- Treatment 2, Tenacity 5 oz/A also exhibited low levels of fine fescue injury 21 days after application two (DAA2) and 21 DAA3, with marginally acceptable fine fescue injury levels 7 DAA3. Differences were statistically significant 7 DAA3 when compared to the untreated check.
- While several of the remaining treatments including Treatments 12-14, GF-142, Treatment 10, Grass-Getter and Treatment 9, SpeedZone Southern + QuickSilver + Turflon showed subtle and short term turfgrass color effects, none exhibited fine fescue injury levels that would cause concern to golf course superintendents. Treatment 11, Fusilade exhibited no visual injury to fine fescue on any evaluation date over a 12-week period.

◆ ***Treatment Effects on Percent Bentgrass Cover and Control (Table 3)***

- Table 3 shows the influence of key treatment effects on percent bentgrass cover and statistically calculated percent bentgrass control.

Table 3. Treatment effects on percent bentgrass cover and percent bentgrass control. California Golf Club. 2014.								
	Bent %Cover **** 7/2/14 DOA1	Bent %Cover (%Control) 8/20/14 7DAA3	Bent %Cover (%Control) 9/3/14 21DAA3	Bent %Cover (%Control) 9/24/14 42DAA3	Bent %Cover (%Control) 10/22/14 70DAA3	Bent %Cover (%Control) 11/21/14 100DAA3	Bent %Cover (%Control) 12/22/14 131DAA3	Bent % Control Ranking 1-15 12/22/14 131DAA3
1 Untreated Check	19.0 a ****	19.5 a (0.0%)	22.5 a (0.0%)	22.5 a (0.0%)	22.5 a (0.0%)	23.8 a (0.0%)	27.5 a (0.0%)	15 (0.0%)
2 Tenacity 5 oz/A	19.3 a ****	6.5 b (66.7%)	10.0 ab (55.6%)	5.0 cd (77.8%)	4.5 bc (80.0%)	4.8 bc (80.0%)	6.0 bcd (78.2%)	9 (78.2%)
3 Tenacity+Turflon 5+8 oz/A	20.3 a ****	1.0 b (94.9%)	2.8 b (87.8%)	2.3 d (90.0%)	2.3 c (90.0%)	1.8 c (92.6%)	2.5 cd (90.9%)	6 (90.9%)
4 Tenacity+Turflon 5+16 oz/A	19.5 a ****	0.0 b (100.0%)	1.0 b (95.6%)	1.0 d (95.6%)	1.0 c (95.6%)	0.8 c (96.8%)	1.5 cd (94.5%)	4 (94.5%)
5 Xonerate 2.8 oz/A	19.5 a ****	19.5 a (0.0%)	21.3 a (5.6%)	20.0 ab (11.1%)	19.3 ab (14.4%)	23.0 a (3.2%)	23.8 ab (13.6%)	12 (13.6%)
6 Tenacity+Xonerate 5+1.4 oz/A	19.8 a ****	0.8 b (96.2%)	1.0 b (95.6%)	1.5 d (93.3%)	1.3 c (94.4%)	1.0 c (95.8%)	2.0 cd (92.7%)	5 (92.7%)
7 Tenacity+Xonerate 5+2.8 oz/A	18.8 a ****	0.0 b (100.0%)	0.8 b (96.7%)	0.3 d (98.9%)	0.3 c (98.9%)	0.0 c (100.0%)	3.0 cd (89.1%)	7 (89.1%)
8 SZS+QS 5 pt+2.7 oz/A	19.5 a ****	19.5 a (0.0%)	19.5 a (13.3%)	19.5 abc (13.3%)	19.5 ab (13.3%)	23.3 a (2.1%)	24.5 ab (10.9%)	13 (10.9%)
9 SZS+QS+Turf 5 pt+2.7+8 oz/A	19.8 a ****	19.0 a (2.6%)	19.0 a (15.6%)	19.3 abc (14.4%)	19.3 ab (14.4%)	19.5 ab (17.9%)	20.0 abc (27.3%)	11 (27.3%)
10 Grass-Getter 0.2 oz/M	18.8 a ****	10.8 ab (44.9%)	8.0 ab (64.4%)	7.0 bcd (68.9%)	8.3 abc (63.3%)	8.0 abc (66.3%)	9.3 a-d (66.4%)	10 (66.4%)
	Bent %Cover **** 7/2/14 DOA1	Bent %Cover (%Control) 8/20/14 7DAA2	Bent %Cover (%Control) 9/3/14 21DAA2	Bent %Cover (%Control) 9/24/14 DOA3	Bent %Cover (%Control) 10/22/14 28DAA3	Bent %Cover (%Control) 11/21/14 30DAA2	Bent %Cover (%Control) 12/22/14 61DAA2	Bent % Control Ranking 1-15 12/22/14 61DAA2
11 Fusilade 16 oz/A	19.8 a ****	19.8 a ****	20.3 a ****	20.3 ab ****	1.0 c (95.6%)	0.5 c (97.9%)	4.3 cd (84.5%)	8 (84.5%)
	Bent %Cover **** 7/2/14 DOA1	Bent %Cover (%Control) 8/20/14 DOA3	Bent %Cover (%Control) 9/3/14 14DAA3	Bent %Cover (%Control) 9/24/14 35DAA3	Bent %Cover (%Control) 10/22/14 63DAA3	Bent %Cover (%Control) 11/21/14 93DAA3	Bent %Cover (%Control) 12/22/14 124DAA3	Bent % Control Ranking 1-15 12/22/14 124DAA3
12 GF-142 0.044 lb/A	19.8 a ****	1.5 b (92.3%)	0.3 b (98.9%)	0.3 d (98.9%)	0.0 c (100.0%)	0.0 c (100.0%)	0.0 d (100.0%)	1 (tie) (100.0%)
13 GF-142 0.066 lb/A	21.0 a ****	2.0 b (89.7%)	0.0 b (100.0%)	0.8 d (96.7%)	0.0 c (100.0%)	0.0 c (100.0%)	0.5 cd (98.2%)	3 (98.2%)
14 GF-142 0.088 lb/A	20.5 a ****	0.8 b (96.2%)	0.0 b (100.0%)	0.0 d (100.0%)	0.0 c (100.0%)	0.0 c (100.0%)	0.0 d (100.0%)	1 (tie) (100.0%)
15 Roundup Pro 3 oz/A	18.5 a ****	3.5 b (82.1%)	18.5 a (17.8%)	17.5 abc (22.2%)	20.0 a (11.1%)	23.5 a (1.1%)	24.8 ab (10.0%)	14 (10.0%)
LSD (P=.05)	18.72	10.56	13.39	13.26	13.66	15.55	16.88	
Standard Dev.	13.10	7.39	9.37	9.28	9.56	10.88	11.81	
CV	66.94	89.41	97.1	101.62	120.49	125.79	118.51	

- The highest levels of bentgrass control were observed with the following treatments:

➤ Treatment 12, GF-142 0.044 lb/A: 131 DAA3	100.0% Control
➤ Treatments 14, GF-142 0.088 lb/A: 131 DAA3	100.0% Control
➤ Treatments 13, GF-142 0.066 lb/A: 131 DAA3	98.2% Control
➤ Treatment 4, Tenacity 5 oz/A + Turflon 16 oz/A: 131 DAA3	94.5% Control
➤ Treatment 6, Tenacity 5 oz/A + Xonerate 1.4 oz/A: 131 DAA3	92.7% Control
➤ Treatment 3, Tenacity 5 oz/A + Turflon 16 oz/A: 131 DAA3	90.9% Control
➤ Treatment 7, Tenacity 5 oz/A + Xonerate 2.8 oz/A: 131 DAA3	89.1% Control
➤ Treatment 11, Fusilade 16 oz/A: 61 DAA2	84.5% Control

- Although all three GF-142 treatments exhibited the highest bentgrass control following three sequential applications at six-week intervals and was very safe for use on fine fescue fairways, this experimental product is not yet registered in California or the United States.

- Unfortunately, several of the other treatments that showed some of the highest levels of bentgrass control also exhibited severe and highly unacceptable fine fescue injury and could never be recommended for use on fine fescue fairways. These treatments included Treatment 7, Tenacity 5 oz/A + Xonerate 2.8 oz/A (89.1% bentgrass control), Treatment 6, Tenacity 5 oz/A + Xonerate 1.4 oz/A (92.7% bentgrass control), Treatment 4, Tenacity 5 oz/A + Turflon 16 oz/A (94.5% bentgrass control), and Treatment 3, Tenacity 5 oz/A + Turflon 16 oz/A (90.9% control).

- Of the registered products and treatments evaluated, two sequential applications of Treatment 11, Fusilade deployed at a rate of 16 oz/A at four-week intervals exhibited the highest level of bentgrass control (84.5%) of all treatments that showed no potential to injure fine fescue.

◆ **Treatment Effects on Percent *Poa annua* Cover and Control (Table 4)**

- Table 4 shows the influence of key treatment effects on percent *Poa annua* cover and statistically calculated percent *Poa annua* control.

- Treatment 14, GF-142 0.088 lb/A was the only treatment to exhibit an actual reduction in percent *Poa annua* cover (-9.1%) from the day of application one, July 2, 2014, to December 22, 2014.

Table 4. Treatment effects on percent *Poa annua* cover and percent *Poa annua* control. California Golf Club. 2014.

Treatments	Poa %Cover **** 7/2/14 DOA1	Poa %Cover (%Control) 8/20/14 7DAA3	Poa %Cover (%Control) 9/3/14 21DAA3	Poa %Cover (%Control) 9/24/14 42DAA3	Poa %Cover (%Control) 10/22/14 70DAA3	Poa %Cover (%Control) 11/21/14 100DAA3	Poa %Cover (%Control) 12/22/14 131DAA3	Actual % Δ Poa Cover 7/2/14 to 12/22/14 Ranking 1-15 1 is Best
1 Untreated Check	30.0 a ****	30.5 a (0.0%)	30.0 abc (0.0%)	30.5 abc (0.0%)	35.0 a-e (0.0%)	36.5 a-d (0.0%)	43.8 a-d (0.0%)	+46.0% 4
2 Tenacity 5 oz/A	37.8 a ****	37.3 a (-22.1%)	37.8 ab (-25.8%)	38.5 ab (-26.2%)	54.0 ab (-54.3%)	58.3 ab (-59.6%)	72.5 ab (-65.7%)	+91.8% 6
3 Tenacity+Turflon 5+8 oz/A	22.0 a ****	22.5 a (26.2%)	30.3 abc (-0.8%)	32.3 abc (-5.7%)	47.0 abc (-34.3%)	56.3 abc (-54.1%)	66.5 a-d (-52.0%)	+202.3% 13
4 Tenacity+Turflon 5+16 oz/A	27.3 a ****	28.0 a (8.2%)	40.5 a (-35.0%)	46.5 a (-52.5%)	57.5 a (-64.3%)	63.5 a (-74.0%)	74.5 a (-70.3%)	+172.9% 12
5 Xonerate 2.8 oz/A	12.8 a ****	10.0 a (67.2%)	4.8 c (84.2%)	8.3 c (73.0%)	16.0 cde (54.3%)	17.3 d (52.7%)	25.8 d (41.1%)	+101.6% 7
6 Tenacity+Xonerate 5+ 1.4 oz/A	19.0 a ****	17.8 a (41.8%)	6.5 c (78.3%)	17.0 bc (44.3%)	35.8 a-e (-2.1%)	39.5 a-d (-8.2%)	63.5 a-d (-45.1%)	+234.2% 14
7 Tenacity+Xonerate 5+ 2.8 oz/A	16.3 a ****	9.0 a (70.5%)	3.8 c (87.5%)	11.0 c (63.9%)	44.5 a-d (-27.1%)	64.3 a (-76.0%)	72.0 abc (-64.6%)	+341.7% 15
8 SZS+QS 5 pt+2.7/A	14.0 a ****	14.0 a (54.1%)	14.0 bc (53.3%)	14.8 bc (51.6%)	18.8 cde (46.4%)	20.3 cd (44.5%)	30.8 d (29.7%)	+120.0% 10
9 SZS+QS+Turf 5 pt+2.7+8 oz/A	27.0 a ****	27.0 a (11.5%)	27.0 abc (10.0%)	26.5 abc (13.1%)	27.5 a-e (21.4%)	32.8 a-d (10.3%)	35.0 a-d (20.0%)	+29.6% 3
10 Grass-Getter 0.2 oz/M	34.0 a ****	34.0 a (-11.5%)	34.8 ab (-15.8%)	38.5 ab (-26.2%)	45.3 a-d (-29.3%)	48.0 a-d (-31.5%)	58.8 a-d (-34.3%)	+72.9% 5
Treatments	Poa %Cover **** 7/2/14 DOA1	Poa %Cover (%Control) 8/20/14 7DAA2	Poa %Cover (%Control) 9/3/14 21DAA2	Poa %Cover (%Control) 9/24/14 DOA3	Poa %Cover (%Control) 10/22/14 28DAA3	Poa %Cover (%Control) 11/21/14 30DAA2	Poa %Cover (%Control) 12/22/14 61DAA2	Actual % Δ Poa Cover 7/2/14 to 12/22/14 Ranking 1-15 1 is Best
11 Fusilade 16 oz/A	15.0 a ****	16.8 a ****	18.0 abc ****	21.0 abc ****	22.3 cde (36.4%)	29.8 a-d (18.5%)	32.8 bcd (25.1%)	+118.7% 9
Treatments	Poa %Cover **** 7/2/14 DOA1 ²	Poa %Cover (%Control) 8/20/14 7DAA2	Poa %Cover (%Control) 9/3/14 21DAA2	Poa %Cover (%Control) 9/24/14 DOA3	Poa %Cover (%Control) 10/22/14 28DAA3	Poa %Cover (%Control) 11/21/14 58DAA3	Poa %Cover (%Control) 12/22/14 89DAA3	Actual % Δ Poa Cover 7/2/14 to 12/22/14 Ranking 1-15 1 is Best
12 GF-142 0.044 lb/A	23.3 a ****	25.8 a (15.6%)	21.8 abc (27.5%)	21.5 abc (29.5%)	29.3 a-e (16.4%)	42.5 a-d (-16.4%)	52.3 a-d (-19.4%)	+124.5 11
13 GF-142 0.066 lb/A	28.0 a ****	28.0 a (8.2%)	12.5 bc (58.3%)	12.5 bc (59.0%)	23.0 b-e (34.3%)	26.8 bcd (26.7%)	34.3 a-d (21.7%)	+22.4% 2
14 GF-142 0.088 lb/A	30.8 a ****	30.8 a (-0.8%)	7.5 c (75.0%)	8.5 c (72.1%)	12.3 e (65.0%)	17.8 d (51.4%)	28.0 d (36.0%)	-9.1% 1
Treatments	Poa %Cover **** 7/2/14 DOA1	Poa %Cover (%Control) 8/20/14 DOA3	Poa %Cover (%Control) 9/3/14 14DAA3	Poa %Cover (%Control) 9/24/14 35DAA3	Poa %Cover (%Control) 10/22/14 63DAA3	Poa %Cover (%Control) 11/21/14 93DAA3	Poa %Cover (%Control) 12/22/14 124DAA3	Actual % Δ Poa Cover 7/2/14 to 12/22/14 Ranking 1-15 1 is Best
15 Roundup Pro 3 oz/A	15.0 a ****	13.8 a (54.9%)	11.8 bc (60.8%)	10.3 c (66.4%)	14.5 de (58.6%)	21.5 cd (41.1%)	31.3 cd (28.6%)	+108.7% 8
LSD (P=.05)	25.68	25.31	22.60	22.65	26.78	31.16	34.86	
Standard Dev.	17.97	17.71	15.82	15.85	18.74	21.81	24.39	
CV	76.59	77.0	78.89	70.45	58.25	56.91	50.71	

- From these data it would appear that GF-142 at 0.088 lb/A exhibits some degree of postemergent activity on *Poa annua*. GF-142 is an experimental product and is not yet registered in California or the United States. No other treatment exhibited acceptable levels of *Poa annua* control.
- Those treatments that exhibited the greatest degree of fine fescue injury over the course of the 25-week trial (Treatments 3, 4, 6 and 7), also showed the greatest increases in percent *Poa annua* cover. It is hypothesized that these injury effects reduced fine fescue vigor and shifted the competitive balance in the stand from fine fescue to *Poa annua*.

Summary and Practical Perspectives

- There was a wide range of variance in fine fescue safety among the treatments and active ingredients evaluated in this replicated field trial.
- Unfortunately, several treatments that showed high levels of bentgrass control also exhibited severe and highly unacceptable fine fescue injury and should never be used on fine fescue fairways. Those treatments that exhibited unacceptable fine fescue injury included the following: Tenacity 5 oz/A + Xonerate 2.8 oz/A, Tenacity 5 oz/A + Xonerate 1.4 oz/A, Tenacity 5 oz/A + Turflon 16 oz/A and Xonerate 2.8 oz/A.
- GF-142 deployed at 0.044, 0.066 and 0.088 lb/A, exhibited the highest bentgrass control of all treatments following three sequential applications at six-week intervals and was very safe for use on fine fescue fairways. However, this experimental product is not yet registered in California or the United States.
- Of the registered products and treatments evaluated, two sequential applications of Fusilade deployed at a rate of 16 oz/A at four-week intervals exhibited the highest level of bentgrass control (84.5%). Fusilade was very safe for use on fine fescue fairways at the 16 oz/A rate and showed absolutely no observed visual fine fescue injury during any of four evaluation dates over an eight-week period.
- GF-142 deployed at 0.088 lb/A was the only treatment to exhibit an actual reduction in percent *Poa annua* cover (-9.1%) from the day of application one, July 2, 2014, to December 22, 2014. From these data it would appear that GF-142 at 0.088 lb/A exhibits some degree of postemergent activity on *Poa annua*.
- Those treatments that exhibited the greatest degree of fine fescue injury over the course of the 25-week trial also showed the greatest increases in percent *Poa annua* cover. It is hypothesized that these injury effects reduced fine fescue vigor and shifted the competitive balance in the stand from fine fescue to *Poa annua*. For this reason, selecting products and programs that are very safe for use on fine fescue is a critically essential component of a sound agronomic program for both bentgrass control and *Poa annua* suppression.