Annual Bluegrass Control and Dollar Spot Suppression in Fairway Height Creeping Bentgrass

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Introduction

This study was conducted on a mature stand of 'Penneagle' 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 applications of selected materials could reduce dollar spot (*Sclerotinia homoeocarpa*) and the annual bluegrass population under fairway conditions.

Methods and Materials

This study was a randomized complete block design with three replications. Treatments were applied on June 2 (JUNE), June 9 (7 DAT), June 14 (14 DAT), June 21 (21 DAT), June 30 (28 DAT), July 7 (35 DAT), July 15 (42 DAT), Sept 7 (SEPT), Oct 5 (OCT), and Nov 11, 2004 (NOV) using a three foot CO_2 powered boom sprayer calibrated to deliver 40 gpa using two, flat fan, 11004 nozzles at 40 psi. The test area was maintained at 0.5 inch using a five-plex reel mower that collected clippings. Turfgrass was irrigated on an as needed basis to prevent moisture stress.

The test site consisted of approximately 70 percent creeping bentgrass and 30 percent annual bluegrass at the initiation of the study. The annual bluegrass population was visually evaluated on May 23, 2004, on a plot by plot basis, to determine the baseline population in each plot. The change in the annual bluegrass population was compared to these baseline ratings.

On July 21, 2004, the test area was put on a maintenance fungicide program to control disease.

Results and Discussion

Turfgrass discoloration was rated four times (Table 1). All turfgrass treated with Velocity at any rate or formulation was rated below acceptable (7.0) at least once over this time period. By the July 28th rating date no unacceptable discoloration was found. On July 13, 2004 turfgrass treated with Trimmit was rated below acceptable (6.0).

Dollar spot was rated 15 times (Table 2). There was no significant differences found on the June 7th and 14th rating dates between treated or non-treated turfgrass. Turfgrass treated with Velocity had less dollar spot, when compared to non-treated turfgrass on the June 23rd, 30th, and July 13th rating dates with the exception of Velocity plus Aquathol K, Velocity 80WP at 45 g ai/A plus MacroSorb Foliar at 2 oz/M applied once (JUNE), and Velocity 80WP at 60 g ai/A plus GBJ2 at 2 oz/M applied once (JUNE). Generally, turfgrass treated with multiple applications of

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Velocity tended to have less dollar spot when compared to non-treated. On the June 23rd rating date turfgrass treated with Trimmit was not significantly different than non-treated. On the July 13th, 21st, 28th, and August 3rd rating dates turfgrass treated with Trimmit had significantly less dollar spot than non-treated turfgrass. On the August 18th rating date, only turfgrass treated with Trimmit at 0.66 lb ai/A applied JUNE, SEPT, and OCT was not significantly different than non-treated turfgrass, all other turfgrass treated with Trimmit had significantly less dollar spot. On the August 25th rating date, all turfgrass treated with Trimmit had significantly less dollar spot. The next rating date, August 31st, only turfgrass treated with Trimmit combined with Rubigan or 18-3-4 had significantly less dollar spot than non-treated, all other turfgrass treated with Trimmit was not significantly different than non-treated. Generally, turfgrass treated with Trimmit tended to provide dollar spot suppression until ratings stopped on September 29th. Turfgrass treated with Rubigan tended to have less dollar spot than non-treated. Ratings of percent dollar spot stopped before treatments of Prograss or combinations of Prograss were applied.

On May 12, 2005 turfgrass was rated for the percent reduction of annual bluegrass (Table 3). Only turfgrass treated with Velocity 80WP at 45 g ai/A plus MacroSorb Foliar at 2 oz/M applied once (JUNE) and Rubigan alone did not significantly reduce the annual bluegrass in the sward compared to non-treated. When Trimmit was combined with Prograss, annual bluegrass was reduced significantly more that Prograss applied alone. Although not significantly different from other treated turfgrass, turfgrass treated with Trimmit alone or in combination with 18-3-4, Rubigan, or Prograss at the 0.75 lb ai/A rate and Velocity 80WP at 60 g ai/A plus 18-3-4 applied in JUNE and 28 DAT reduced the annual bluegrass by 80% or more.

It appears that applications of these materials will provide good to excellent control of dollar spot and significantly reduce the annual bluegrass populations in the mixed species sward.

Table 1. Discoloration of a mixed fairway height sward of 'Penneagle' creeping bentgrass and annual bluegrass in 2004.

Treatment	Form	Rate (lb ai/A)	Timing	(-----Discoloration-------) 6/7	6/9	7/13	7/28
VELOCITY	80WP	45 G AI/A	JUNE	6.0[1]	5.7	10.0	10.0
VELOCITY	80WP	30 G AI/A	JUNE/14DAT	6.7	6.0	10.0	10.0
VELOCITY	80WP	45 G AI/A	JUNE/14DAT	5.8	5.5	10.0	10.0
VELOCITY	80WP	30 G AI/A	JUNE/14/28DAT	5.8	6.8	10.0	10.0
VELOCITY	17.6WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	6.5	6.7	7.3	10.0
VELOCITY	80WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	7.8	6.5	8.3	10.0
VELOCITY	80WP	20 G AI/A	JUNE/14/28/42DAT	6.7	6.5	9.3	10.0
VELOCITY	80WP	60 G AI/A	JUNE	5.8	5.3	9.5	10.0
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	5.8	5.0	8.7	10.0
VELOCITY	80WP	10 G AI/A	JUNE	4.7	4.8	10.0	10.0
AQUATHOL K	4.23L	0.25	JUNE				
VELOCITY	80WP	45 G AI/A	JUNE	5.7	5.3	10.0	10.0
18-3-4	1.75L	0.2 LB AI/M	JUNE				
VELOCITY	80WP	45 G AI/A	JUNE	6.2	6.0	9.7	10.0
MACROSORB FOLIAR	L	2 OZ/M	JUNE				
VELOCITY	80WP	60 G AI/A	JUNE	6.5	5.0	10.0	10.0
18-3-4	1.75L	0.2 LB AI/M	JUNE				
VELOCITY	80WP	60 G AI/A	JUNE	5.8	5.0	10.0	10.0
MACROSORB FOLIAR	L	2 OZ/M	JUNE				
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	5.8	5.0	10.0	10.0
18-3-4	1.75L	0.2 LB AI/M	JUNE/28DAT				
CHECK				10.0	10.0	10.0	10.0
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	5.8	5.3	9.3	10.0
MACROSORB FOLIAR	L	2 OZ/M	JUNE/28DAT				
VELOCITY	80WP	60 G AI/A	JUNE	6.0	4.3	10.0	10.0
GBJ2	L	2 OZ/M	JUNE				
VELOCITY	80WP	45 G AI/A	JUNE	6.2	5.8	10.0	10.0
GBJ2	L	2 OZ/M	JUNE				
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	8.7	10.0	10.0	10.0
18-3-4	1.75L	0.2 LB AI/M	JUNE/SEPT/OCT				
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	7.5	8.5	10.0	10.0
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	8.0	9.3	10.0	10.0
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT				
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT	7.7	9.0	10.0	10.0
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	8.2	8.7	10.0	7.0
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT				
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	8.3	7.8	6.0	7.3
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	9.0	9.3	8.3	8.3
18-3-4	1.75L	0.2 LB AI/M	JUNE/28/42/SEPT/OCT				
PROGRASS	1.5EC	0.75	OCT/NOV	10.0	10.0	10.0	10.0
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	9.3	9.3	8.3	7.3
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT				
18-3-4	1.75L	0.2LB AI/M	JUNE/28/42/SEPT/OCT				
PROGRASS	1.5EC	0.75	OCT/NOV	10.0	10.0	10.0	10.0
TRIMMIT	2SC	0.75	OCT/NOV				
PROGRASS	1.5EC	0.375	OCT/NOV	10.0	10.0	10.0	10.0
TRIMMIT	2SC	0.375	OCT/NOV				

1 – Discoloration rated on a scale of 0 to 10 where 0= worst, 7 = acceptable, and 10 = no discoloration.

Table 2. Percent dollar spot in a mixed fairway height sward of 'Penneagle' creeping bentgrass and annual bluegrass in 2004.

Treatment	Form	Rate (lb ai/A)	Timing	(-----Percent Dollar Spot----------) 6/7	6/14	6/23	6/30	7/13
VELOCITY	80WP	45 G AI/A	JUNE	0.0a[1]	0.0b	0.2b	2.3efg	10.0d-h
VELOCITY	80WP	30 G AI/A	JUNE/14DAT	0.0a	0.0b	0.2b	2.3efg	5.3e-h
VELOCITY	80WP	45 G AI/A	JUNE/14DAT	0.0a	0.0b	0.2b	0.3g	2.3fgh
VELOCITY	80WP	30 G AI/A	JUNE/14/28DAT	0.0a	0.0b	0.3b	1.0fg	2.3fgh
VELOCITY	17.6WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	0.0a	0.0b	0.3b	1.0fg	3.7fgh
VELOCITY	80WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	0.0a	0.0b	0.2b	2.0efg	1.0gh
VELOCITY	80WP	20 G AI/A	JUNE/14/28/42DAT	0.0a	0.3ab	0.3b	1.0fg	3.7fgh
VELOCITY	80WP	60 G AI/A	JUNE	0.0a	0.3ab	0.2b	4.0d-g	11.7c-f
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	0.0a	0.3ab	0.2b	5.7c-g	5.0e-h
VELOCITY	80WP	10 G AI/A	JUNE	0.0a	0.3ab	0.3b	6.7b-f	13.3b-e
AQUATHOL K	4.23L	0.25	JUNE					
VELOCITY	80WP	45 G AI/A	JUNE	0.0a	0.3ab	0.3b	8.7a-d	6.7d-h
18-3-4	1.75L	0.2 LB AI/M	JUNE					
VELOCITY	80WP	45 G AI/A	JUNE	0.0a	0.7ab	0.2b	7.0b-e	15.0bcd
MACROSORB FOLIAR	L	2 OZ/M	JUNE					
VELOCITY	80WP	60 G AI/A	JUNE	0.0a	0.0b	0.2b	4.0d-g	10.3d-g
18-3-4	1.75L	0.2 LB AI/M	JUNE					
VELOCITY	80WP	60 G AI/A	JUNE	0.0a	0.0b	0.0b	2.3efg	10.3d-g
MACROSORB FOLIAR	L	2 OZ/M	JUNE					
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	0.0a	0.0b	0.2b	1.0fg	1.0gh
18-3-4	1.75L	0.2 LB AI/M	JUNE/28DAT					
CHECK				0.0a	0.3ab	0.7b	13.3a	21.7ab
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	0.0a	0.0b	0.2b	3.7d-g	6.7d-h
MACROSORB FOLIAR	L	2 OZ/M	JUNE/28DAT					
VELOCITY	80WP	60 G AI/A	JUNE	0.0a	0.0b	0.2b	2.3efg	15.0bcd
GBJ2	L	2 OZ/M	JUNE					
VELOCITY	80WP	45 G AI/A	JUNE	0.0a	0.3ab	0.2b	1.0fg	11.7c-f
GBJ2	L	2 OZ/M	JUNE					
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	0.0a	0.3ab	0.0b	2.0efg	6.7d-h
18-3-4	1.75L	0.2 LB AI/M	JUNE/SEPT/OCT					
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	0.0a	0.0b	0.0b	2.3efg	5.3e-h
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	0.0a	0.0b	0.0b	2.0efg	0.7h
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT					
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT	0.0a	0.0b	0.2b	4.0d-g	2.3fgh
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	0.0a	0.0b	0.0b	2.0efg	2.3fgh
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT					
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	0.0a	0.3ab	0.0b	2.3efg	2.3fgh
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	0.0a	0.0b	0.2b	3.7d-g	7.0d-h
18-3-4	1.75L	0.2 LB AI/M	JUNE/28/42/SEPT/OCT					
PROGRASS	1.5EC	0.75	OCT/NOV	0.0a	1.7ab	3.8a	11.7ab	25.0a
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	0.0a	0.3ab	0.0b	2.0efg	2.0gh
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT					
18-3-4	1.75L	0.2LB AI/M	JUNE/28/42/SEPT/OCT					
PROGRASS	1.5EC	0.75	OCT/NOV	0.0a	1.7ab	1.5b	10.0abc	15.0bcd
TRIMMIT	2SC	0.75	OCT/NOV					
PROGRASS	1.5EC	0.375	OCT/NOV	0.0a	2.0a	2.0b	13.3a	20.0abc
TRIMMIT	2SC	0.375	OCT/NOV					

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

Table 2 (cont.). Percent dollar spot in a mixed fairway height sward of 'Penneagle' creeping bentgrass and annual bluegrass in 2004.

Treatment	Form	Rate (lb ai/A)	Timing	(-----Percent Dollar Spot----------) 7/21	7/28	8/3
VELOCITY	80WP	45 G AI/A	JUNE	16.7c-g[1]	18.3b-f	18.3c-f
VELOCITY	80WP	30 G AI/A	JUNE/14DAT	13.3e-i	13.7d-i	20.0c-f
VELOCITY	80WP	45 G AI/A	JUNE/14DAT	10.0g-k	10.0e-i	16.7def
VELOCITY	80WP	30 G AI/A	JUNE/14/28DAT	8.3h-l	7.0f-i	11.7efg
VELOCITY	17.6WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	10.0g-k	5.0f-i	11.7efg
VELOCITY	80WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	6.7i-l	3.3ghi 1	1.7efg
VELOCITY	80WP	20 G AI/A	JUNE/14/28/42DAT	8.3h-l	3.7ghi	11.7efg
VELOCITY	80WP	60 G AI/A	JUNE	20.0b-e	23.3a-e	23.3b-e
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	11.7f-j	7.0f-i	16.7def
VELOCITY	80WP	10 G AI/A	JUNE	18.3b-f	25.0a-d	25.0a-e
AQUATHOL K	4.23L	0.25	JUNE			
VELOCITY	80WP	45 G AI/A	JUNE	16.7c-g	13.7d-i	18.3c-f
18-3-4	1.75L	0.2 LB AI/M	JUNE			
VELOCITY	80WP	45 G AI/A	JUNE	23.3abc	28.3abc	26.7a-d
MACROSORB FOLIAR	L	2 OZ/M	JUNE			
VELOCITY	80WP	60 G AI/A	JUNE	16.7c-g	17.0b-g	25.0a-e
18-3-4	1.75L	0.2 LB AI/M	JUNE			
VELOCITY	80WP	60 G AI/A	JUNE	16.7c-g	15.3c-h	21.7b-f
MACROSORB FOLIAR	L	2 OZ/M	JUNE			
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	5.3jkl	1.0hi	8.3fg
18-3-4	1.75L	0.2 LB AI/M	JUNE/28DAT			
CHECK				25.0ab	30.0ab	35.0ab
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	10.0g-k	5.0f-i	15.0d-g
MACROSORB FOLIAR	L	2 OZ/M	JUNE/28DAT			
VELOCITY	80WP	60 G AI/A	JUNE	18.3b-f	25.0a-d	26.7a-d
GBJ2	L	2 OZ/M	JUNE			
VELOCITY	80WP	45 G AI/A	JUNE	16.7c-g	18.7b-f	23.3b-e
GBJ2	L	2 OZ/M	JUNE			
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	11.7f-j	13.3d-i	20.0c-f
18-3-4	1.75L	0.2 LB AI/M	JUNE/SEPT/OCT			
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	15.0d-h	15.0c-i	16.7def
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	2.3kl	0.7i	8.3fg
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT			
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT	7.0i-l	5.3f-i	15.0d-g
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	2.3kl	0.7i	2.3g
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT			
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	5.7i-l	8.3f-i	12.0efg
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	5.7i-l	5.3f-i	7.3fg
18-3-4	1.75L	0.2 LB AI/M	JUNE/28/42/SEPT/OCT			
PROGRASS	1.5EC	0.75	OCT/NOV	28.3a	33.3a	35.0ab
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	1.0l	2.0hi	2.3g
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT			
18-3-4	1.75L	0.2LB AI/M	JUNE/28/42/SEPT/OCT			
PROGRASS	1.5EC	0.75	OCT/NOV	21.7a-d	30.0ab	31.7abc
TRIMMIT	2SC	0.75	OCT/NOV			
PROGRASS	1.5EC	0.375	OCT/NOV	28.3a	33.3a	38.3a
TRIMMIT	2SC	0.375	OCT/NOV			

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

Table 2 (cont.). Percent dollar spot in a mixed fairway height sward of 'Penneagle' creeping bentgrass and annual bluegrass in 2004.

Treatment	Form	Rate (lb ai/A)	Timing	(-----Percent Dollar Spot----------) 8/18	8/25	8/31
VELOCITY	80WP	45 G AI/A	JUNE	5.3def[1]	20.0a-f	15.0c-g
VELOCITY	80WP	30 G AI/A	JUNE/14DAT	5.0def	15.3b-f	12.0d-g
VELOCITY	80WP	45 G AI/A	JUNE/14DAT	2.3ef	13.3c-f	13.3d-g
VELOCITY	80WP	30 G AI/A	JUNE/14/28DAT	2.3ef	16.7b-f	16.7c-g
VELOCITY	17.6WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	2.3ef	18.3a-f	18.3b-g
VELOCITY	80WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	1.0f	13.3c-f	10.0efg
VELOCITY	80WP	20 G AI/A	JUNE/14/28/42DAT	1.0f	10.0c-f	10.0efg
VELOCITY	80WP	60 G AI/A	JUNE	15.0a-d	25.0a-d	25.0a-d
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	5.7def	12.0c-f	13.7d-g
VELOCITY	80WP	10 G AI/A	JUNE	11.7b-f	23.3a-e	23.3a-e
AQUATHOL K	4.23L	0.25	JUNE			
VELOCITY	80WP	45 G AI/A	JUNE	5.0def	11.7c-f	8.7fg
18-3-4	1.75L	0.2 LB AI/M	JUNE			
VELOCITY	80WP	45 G AI/A	JUNE	13.7b-e	30.0ab	23.3a-e
MACROSORB FOLIAR	L	2 OZ/M	JUNE			
VELOCITY	80WP	60 G AI/A	JUNE	15.0a-d	26.7abc	25.0a-d
18-3-4	1.75L	0.2 LB AI/M	JUNE			
VELOCITY	80WP	60 G AI/A	JUNE	12.0b-f	23.3a-e	20.0a-g
MACROSORB FOLIAR	L	2 OZ/M	JUNE			
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	0.7f	10.3c-f	8.7fg
18-3-4	1.75L	0.2 LB AI/M	JUNE/28DAT			
CHECK				15.0a-d	33.3a	25.0a-d
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	2.3ef	3.3f	8.3fg
MACROSORB FOLIAR	L	2 OZ/M	JUNE/28DAT			
VELOCITY	80WP	60 G AI/A	JUNE	10.0c-f	16.7b-f	18.3b-g
GBJ2	L	2 OZ/M	JUNE			
VELOCITY	80WP	45 G AI/A	JUNE	11.7b-f	20.0a-f	18.3b-g
GBJ2	L	2 OZ/M	JUNE			
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	7.0def	18.3a-f	21.7a-f
18-3-4	1.75L	0.2 LB AI/M	JUNE/SEPT/OCT			
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	5.3def	16.7b-f	16.7c-g
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	0.0f	5.0f	8.3fg
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT			
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT	0.3f	13.3c-f	11.7d-g
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	0.3f	7.0ef	8.3fg
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT			
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	2.0ef	8.3def	11.7d-g
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	1.7ef	5.7f	8.7fg
18-3-4	1.75L	0.2 LB AI/M	JUNE/28/42/SEPT/OCT			
PROGRASS	1.5EC	0.75	OCT/NOV	26.7a	30.0ab	31.7ab
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	0.3f	6.7ef	7.0g
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT			
18-3-4	1.75L	0.2LB AI/M	JUNE/28/42/SEPT/OCT			
PROGRASS	1.5EC	0.75	OCT/NOV	20.0abc	31.7ab	28.3abc
TRIMMIT	2SC	0.75	OCT/NOV			
PROGRASS	1.5EC	0.375	OCT/NOV	23.3ab	31.7ab	33.3a
TRIMMIT	2SC	0.375	OCT/NOV			

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

Table 2 (cont.). Percent dollar spot in a mixed fairway height sward of 'Penneagle' creeping bentgrass and annual bluegrass in 2004.

Treatment	Form	Rate (lb ai/A)	Timing	(----------Percent Dollar Spot----------) 9/8	9/16	9/22	9/29
VELOCITY	80WP	45 G AI/A	JUNE	13.3b-e[1]	20.0d-i	7.0a-e	0.7c
VELOCITY	80WP	30 G AI/A	JUNE/14DAT	10.0cde	23.3b-g	3.3cde	0.3c
VELOCITY	80WP	45 G AI/A	JUNE/14DAT	5.3de	25.0a-g	5.3b-e	0.0c
VELOCITY	80WP	30 G AI/A	JUNE/14/28DAT	13.3b-e	21.7c-h	8.3a-e	0.0c
VELOCITY	17.6WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	13.3b-e	23.3b-g	13.3ab	0.3c
VELOCITY	80WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	8.3de	15.0e-i	5.3b-e	0.3c
VELOCITY	80WP	20 G AI/A	JUNE/14/28/42DAT	8.3de	18.3e-i	8.3a-e	3.3bc
VELOCITY	80WP	60 G AI/A	JUNE	21.7abc	28.3a-e	11.7abc	5.3abc
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	10.3cde	18.3e-i	8.3a-e	3.3bc
VELOCITY	80WP	10 G AI/A	JUNE	18.3a-d	35.0ab	8.7a-e	1.7c
AQUATHOL K	4.23L	0.25	JUNE				
VELOCITY	80WP	45 G AI/A	JUNE	7.0de	18.3e-i	5.0b-e	3.3bc
18-3-4	1.75L	0.2 LB AI/M	JUNE				
VELOCITY	80WP	45 G AI/A	JUNE	13.3b-e	25.0a-g	11.7abc	3.3bc
MACROSORB FOLIAR	L	2 OZ/M	JUNE				
VELOCITY	80WP	60 G AI/A	JUNE	18.3a-d	28.3a-e	11.7abc	0.0c
18-3-4	1.75L	0.2 LB AI/M	JUNE				
VELOCITY	80WP	60 G AI/A	JUNE	15.0a-e	25.0a-g	7.0a-e	1.7c
MACROSORB FOLIAR	L	2 OZ/M	JUNE				
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	8.3de	13.3f-i	5.0b-e	1.7c
18-3-4	1.75L	0.2 LB AI/M	JUNE/28DAT				
CHECK				25.0ab	36.7a	15.0a	3.7bc
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	3.3e	15.0e-i	0.7e	0.0c
MACROSORB FOLIAR	L	2 OZ/M	JUNE/28DAT				
VELOCITY	80WP	60 G AI/A	JUNE	15.0a-e	25.0a-g	6.7a-e	3.3bc
GBJ2	L	2 OZ/M	JUNE				
VELOCITY	80WP	45 G AI/A	JUNE	18.3a-d	26.7a-f		8.7a-e
0.0c							
GBJ2	L	2 OZ/M	JUNE				
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	10.0cde	16.7e-i	10.3a-d	0.3c
18-3-4	1.75L	0.2 LB AI/M	JUNE/SEPT/OCT				
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	11.7cde	20.0d-i	10.0a-d	0.3c
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	5.3de	11.7ghi	2.3de	0.3c
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT				
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT	10.0cde	18.3e-i	2.3de	0.3c
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	5.3de	8.3i	0.7e	0.3c
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT				
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	7.0de	15.0e-i	3.7cde	0.3c
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	4.0e	10.0hi	0.3e	0.0c
18-3-4	1.75L	0.2 LB AI/M	JUNE/28/42/SEPT/OCT				
PROGRASS	1.5EC	0.75	OCT/NOV	26.7a	33.3abc	10.0a-d	8.3ab
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	6.7de	8.7hi	0.0e	0.0c
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT				
18-3-4	1.75L	0.2LB AI/M	JUNE/28/42/SEPT/OCT				
PROGRASS	1.5EC	0.75	OCT/NOV	18.3a-d	31.7a-d	13.3ab	10.0a
TRIMMIT	2SC	0.75	OCT/NOV				
PROGRASS	1.5EC	0.375	OCT/NOV	21.7abc	35.0ab	11.7abc	3.7bc
TRIMMIT	2SC	0.375	OCT/NOV				

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

Table 3. Percent annual bluegrass reduction in a mixed fairway height sward of 'Penneagle' creeping bentgrass and annual bluegrass. Ratings taken on May 12, 2005.

Treatment	Form	Rate (lb ai/A)	Timing	Percent Reduction
VELOCITY	80WP	45 G AI/A	JUNE	51.9c-h[1]
VELOCITY	80WP	30 G AI/A	JUNE/14DAT	48.3d-i
VELOCITY	80WP	45 G AI/A	JUNE/14DAT	53.8b-h
VELOCITY	80WP	30 G AI/A	JUNE/14/28DAT	68.3a-g
VELOCITY	17.6WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	58.3b-h
VELOCITY	80WP	10 G AI/A	JUNE/7/14DAT 21/28/35DAT	74.2a-f
VELOCITY	80WP	20 G AI/A	JUNE/14/28/42DAT	65.6a-g
VELOCITY	80WP	60 G AI/A	JUNE	65.0a-g
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	77.8a-e
VELOCITY	80WP	10 G AI/A	JUNE	33.6ghi
AQUATHOL K	4.23L	0.25	JUNE	
VELOCITY	80WP	45 G AI/A	JUNE	38.3f-i
18-3-4	1.75L	0.2 LB AI/M	JUNE	
VELOCITY	80WP	45 G AI/A	JUNE	26.7hij
MACROSORB FOLIAR	L	2 OZ/M	JUNE	
VELOCITY	80WP	60 G AI/A	JUNE	51.1c-i
18-3-4	1.75L	0.2 LB AI/M	JUNE	
VELOCITY	80WP	60 G AI/A	JUNE	52.8b-h
MACROSORB FOLIAR	L	2 OZ/M	JUNE	
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	84.4a-d
18-3-4	1.75L	0.2 LB AI/M	JUNE/28DAT	
CHECK				0.0j
VELOCITY	80WP	60 G AI/A	JUNE/28DAT	61.7a-h
MACROSORB FOLIAR	L	2 OZ/M	JUNE/28DAT	
VELOCITY	80WP	60 G AI/A	JUNE	50.0c-i
GBJ2	L	2 OZ/M	JUNE	
VELOCITY	80WP	45 G AI/A	JUNE	45.0e-i
GBJ2	L	2 OZ/M	JUNE	
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	98.0a
18-3-4	1.75L	0.2 LB AI/M	JUNE/SEPT/OCT	
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	98.1a
TRIMMIT	2SC	0.66	JUNE/SEPT/OCT	97.4a
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT	
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT	15.8ij
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	84.4a-d
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT	
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	95.3a
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	89.3ab
18-3-4	1.75L	0.2 LB AI/M	JUNE/28/42/SEPT/OCT	
PROGRASS	1.5EC	0.75	OCT/NOV	52.3c-h
TRIMMIT	2SC	0.4	JUNE/28/42/SEPT/OCT	86.1abc
RUBIGAN	1AS	0.75 OZ/M	JUNE/28/42/SEPT/OCT	
18-3-4	1.75L	0.2LB AI/M	JUNE/28/42/SEPT/OCT	
PROGRASS	1.5EC	0.75	OCT/NOV	97.7a
TRIMMIT	2SC	0.75	OCT/NOV	
PROGRASS	1.5EC	0.375	OCT/NOV	76.4a-e
TRIMMIT	2SC	0.375	OCT/NOV	

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