

# Evaluation of Plant Growth Regulators and Other Materials Applied to Fairway Height Creeping Bentgrass

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## Introduction

This study was conducted on a mature stand of 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 the efficacy of a fungicide, herbicide, and plant growth regulators alone or in combination with a liquid fertilizer using color ratings, measurements of plant height, and fresh weight foliar yield.

## Methods and Materials

This study was a randomized complete block design with three replications. Treatments were applied on June 7 (SUMMER), June 23 (2 WAT) and July 12, 2005 (4 WAT) using a three foot CO<sub>2</sub> powered boom sprayer calibrated to deliver 40 gpa using two, flat fan, 11004 nozzles at 40 psi. The test site was maintained similar to that of a golf course fairway with respect to irrigation, fertilization and mowing. Turfgrass height was measured using a Turfcheck 1 prism.

## Results and Discussion

Turfgrass color was rated nine times during the study (Table 1). Only on the first rating date, June 15<sup>th</sup>, was unacceptable turfgrass color found following the application of Velocity at 45 g ai/A or greater.

Turfgrass height was rated ten times during the study (Table 2). On the June 15<sup>th</sup> rating date, turfgrass treated with Trimmit plus Rubigan at 1.5 oz/M, Trimmit plus 18-3-1 (fertilizer), and Velocity at 60 g ai/A had significantly lower height than untreated. On the June 22<sup>nd</sup> rating date, turfgrass treated with Trimmit plus Rubigan at 0.75 oz/M with or without 18-3-1, Trimmit plus Rubigan at 1.5 oz/M plus 18-3-1, Trimmit plus 18-3-1, and Trimmit plus Banner MAXX had significantly lower height than untreated. On the June 30<sup>th</sup> rating date, turfgrass treated with Trimmit in any combination had significantly lower height than untreated. On the July 7<sup>th</sup> rating date, turfgrass treated with Trimmit plus Rubigan at 1.5 oz/M and Trimmit plus Banner MAXX had significantly lower height than untreated. On the July 12<sup>th</sup> rating date, turfgrass treated with Trimmit plus banner MAXX had significantly lower height than untreated.

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On the July 28<sup>th</sup> rating date, turfgrass treated with Trimmit in any combination and Cutless at 12 oz/A alone had significantly lower height than untreated. On the August 4<sup>th</sup> rating date, turfgrass treated with Trimmit plus Rubigan at 0.75 oz/M had significantly lower height than untreated. On the August 9<sup>th</sup> rating date, turfgrass treated with Trimmit plus Rubigan at 0.75 oz/M, Trimmit plus Rubigan at 1.5 oz/M with and without 18-3-1, and Trimmit plus 18-3-1 had significantly lower height than untreated. Finally, on the August 17<sup>th</sup> rating date, turfgrass treated with Trimmit plus 18-3-1 had significantly higher height than untreated.

Turfgrass fresh clipping weight was taken eight times during the study (Table 3). On the June 22<sup>nd</sup> rating date, turfgrass treated with Trimmit in any combination had significantly less fresh clipping weight than untreated. On the June 30<sup>th</sup> rating date, turfgrass treated with Trimmit plus Banner MAXX had significantly less fresh clipping weight than untreated. On the July 12<sup>th</sup> rating date, turfgrass treated with Trimmit plus Rubigan at 1.5 oz/M plus 18-3-1 had significantly more fresh clipping weight than untreated. On the July 20<sup>th</sup> and August 9<sup>th</sup> rating dates, turfgrass treated with Velocity at the 30 and 45 g ai/A rate had significantly more fresh clipping weight than untreated. Finally, on the August 17<sup>th</sup> rating date, turfgrass treated with Trimmit plus Rubigan at 0.75 oz/M plus 18-3-1 had significantly more fresh clipping weight than untreated.



**Table 2.** Height ratings (in inches) of materials applied to creeping bentgrass taken in 2005.

Treatment	Form	Rate lb ai/A	Timing	Height				
				6-15	6-22	6-30	7-7	7-12
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.40c-f	0.36de	0.37bc	0.39ab	0.39a-d
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.40c-f	0.35e	0.37bc	0.40ab	0.40abc
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT					
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.38ef	0.37b-e	0.37bc	0.38bc	0.40abc
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.40c-f	0.36cde	0.37bc	0.41ab	0.42ab
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT					
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.39def	0.36cde	0.37bc	0.40ab	0.39a-d
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT					
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT	0.44abc	0.41ab	0.43a	0.42a	0.40abc
CHECK				0.46a	0.41ab	0.41ab	0.42a	0.43a
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT	0.44abc	0.39a-e	0.41ab	0.41ab	0.40abc
VELOCITY	80WP	30 G A/A	JUNE/2 WAT	0.41c-f	0.41ab	0.39ab	0.39abc	0.39a-d
VELOCITY	80WP	45 G A/A	JUNE/2 WAT	0.39def	0.42a	0.38abc	0.40ab	0.38bcd
VELOCITY	80WP	60 G A/A	JUNE/2 WAT	0.37f	0.38a-e	0.39abc	0.39abc	0.37cd
CUTLESS	50W	12 OZ/A	JUNE/4 WAT	0.43a-d	0.38a-e	0.41ab	0.41ab	0.42ab
CUTLESS	50W	12 OZ /A	JUNE/4 WAT	0.45ab	0.39a-d	0.41ab	0.41ab	0.40abc
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT					
CUTLESS	50W	12 OZ/A	JUNE/4 WAT	0.41b-f	0.40abc	0.41ab	0.40ab	0.39a-d
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.42a-e	0.36cde	0.34c	0.36c	0.36d
BANNER MAXX	1.3L	44 FL OZ/A	JUNE/4 WAT					

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

**Table 2 (continued).** Height ratings (in inches) of materials applied to creeping bentgrass taken in 2005.

Treatment	Form	Rate lb ai/A	Timing	Height				
				7-20	7-28	8-4	8-9	8-17
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.43b	0.41efg	0.42c	0.41d	0.64abc
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.43b	0.43c-f	0.44abc	0.43bcd	0.66ab
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT					
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.44b	0.37g	0.45abc	0.40d	0.63a-d
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.43b	0.39efg	0.44abc	0.41d	0.67ab
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT					
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.43b	0.39efg	0.46abc	0.41d	0.69a
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT					
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT	0.52a	0.52a	0.49ab	0.51a	0.62bcd
CHECK				0.48ab	0.49ab	0.49ab	0.48abc	0.60bcd
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT	0.46b	0.48abc	0.46abc	0.48abc	0.57d
VELOCITY	80WP	30 G A/A	JUNE/2 WAT	0.48ab	0.49ab	0.47abc	0.49ab	0.59bcd
VELOCITY	80WP	45 G A/A	JUNE/2 WAT	0.48ab	0.49ab	0.48abc	0.48abc	0.58cd
VELOCITY	80WP	60 G A/A	JUNE/2 WAT	0.49ab	0.49ab	0.51a	0.47abc	0.61bcd
CUTLESS	50W	12 OZ/A	JUNE/4 WAT	0.46ab	0.42d-g	0.48abc	0.43bcd	0.59bcd
CUTLESS	50W	12 OZ /A	JUNE/4 WAT	0.48ab	0.47a-d	0.47abc	0.48abc	0.63a-d
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT					
CUTLESS	50W	12 OZ/A	JUNE/4 WAT	0.47ab	0.44b-e	0.46abc	0.46a-d	0.63a-d
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	0.44b	0.38fg	0.44bc	0.42cd	0.59bcd
BANNER MAXX	1.3L	44 FL OZ/A	JUNE/4 WAT					

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

**Table 3.** Fresh clipping weight (grams) of materials applied to creeping bentgrass taken in 2005.

Treatment	Form	Rate lb ai/A	Timing	Fresh Clipping Weight <sup>1</sup>				
				6-22	6-30	7-7	7-12	7-20
TRIMMIT	2SC	0.4	JUNE/4 WAT	3.93d	5.07cde	3.9ab	6.9ab	7.4e
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	4.20d	5.90cde	4.6ab	8.1ab	7.2e
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT					
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	4.67cd	4.47de	4.2ab	5.6ab	7.3e
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	4.33d	6.43cde	6.3ab	9.5a	9.9de
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT					
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	3.90d	6.10cde	5.5ab	8.6ab	8.4e
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT					
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT	10.90a	13.43a	7.2a	5.2ab	20.9ab
CHECK				8.47ab	9.10a-d	4.8ab	3.8b	14.7b-e
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT	8.77ab	9.47abc	5.2ab	4.3b	20.1abc
VELOCITY	80WP	30 G A/A	JUNE/2 WAT	9.40ab	8.57bcd	5.4ab	5.1ab	24.0a
VELOCITY	80WP	45 G A/A	JUNE/2 WAT	9.00ab	8.77bcd	5.5ab	4.4b	24.8a
VELOCITY	80WP	60 G A/A	JUNE/2 WAT	5.80bcd	6.60b-e	4.0ab	3.8b	18.5a-d
CUTLESS	50W	12 OZ/A	JUNE/4 WAT	8.13abc	9.33abc	5.3ab	3.7b	11.6cde
CUTLESS	50W	12 OZ /A	JUNE/4 WAT	6.33bcd	9.37abc	4.6ab	3.8b	10.9de
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT					
CUTLESS	50W	12 OZ/A	JUNE/4 WAT	8.53ab	11.20ab	6.1ab	5.9ab	13.3b-e
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT					
TRIMMIT	2SC	0.4	JUNE/4 WAT	3.50d	3.87e	2.8b	4.9ab	8.2e
BANNER MAXX	1.3L	44 FL OZ/A	JUNE/4 WAT					

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

**Table 3 (continued).** Fresh clipping weight (grams) of materials applied to creeping bentgrass taken in 2005.

Treatment	Form	Rate lb ai/A	Timing	Fresh Clipping Weight <sup>1</sup>		
				8-4	8-9	8-17
TRIMMIT	2SC	0.4	JUNE/4 WAT	3.6bc	5.5e	22.2abc
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT			
TRIMMIT	2SC	0.4	JUNE/4 WAT	3.7bc	5.5e	35.6a
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT			
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT			
TRIMMIT	2SC	0.4	JUNE/4 WAT	2.4c	4.8e	22.2abc
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT			
TRIMMIT	2SC	0.4	JUNE/4 WAT	3.4bc	6.7de	27.6abc
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT			
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT			
TRIMMIT	2SC	0.4	JUNE/4 WAT	5.6abc	7.0de	32.9ab
18-3-1	1.8L	0.2 LB N/M	JUNE/4 WAT			
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT	7.9a	14.4ab	26.9abc
CHECK				4.8abc	9.8b-e	17.9bc
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT	6.6ab	13.4abc	20.7abc
VELOCITY	80WP	30 G A/A	JUNE/2 WAT	6.6ab	15.3a	20.8abc
VELOCITY	80WP	45 G A/A	JUNE/2 WAT	6.6ab	15.7a	18.7bc
VELOCITY	80WP	60 G A/A	JUNE/2 WAT	4.7abc	11.6a-d	17.2bc
CUTLESS	50W	12 OZ/A	JUNE/4 WAT	4.4bc	8.0cde	16.4c
CUTLESS	50W	12 OZ /A	JUNE/4 WAT	4.6bc	7.8de	17.6bc
RUBIGAN	1AS	0.75 FL OZ/M	JUNE/4 WAT			
CUTLESS	50W	12 OZ/A	JUNE/4 WAT	6.3ab	9.8b-e	22.2abc
RUBIGAN	1AS	1.5 FL OZ/M	JUNE/4 WAT			
TRIMMIT	2SC	0.4	JUNE/4 WAT	3.0c	5.6e	22.7abc
BANNER MAXX	1.3L	44 FL OZ/A	JUNE/4 WAT			

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