

Evaluation of Primo Formulations and Sprayer Nozzles on 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 varying nozzle types (droplet size) to apply Primo MAXX and Primo WSB using color ratings and measurements of plant height and foliar fresh weight yield.

Methods and Materials

This study was a randomized complete block design with three replications. The plot size was 40 ft². All treatments were applied on June 8 and June 23, 2005 using a four foot battery powered walk behind boom sprayer calibrated to deliver 1 (all treatments except nozzle TT11006) or 2 gpm using two nozzles of varying types/droplet size 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 seven times during the study (Table 1). Turfgrass color was never rated below acceptable. The lowest turfgrass color rating during the study was 7.8 on the first rating date (June 15, 2005). There were only slight color differences between treated and untreated turfgrass.

Turfgrass height was rated seven times during the study (Table 2). On the first rating date, June 15th, turfgrass treated with Primo MAXX at 0.125 oz/M with an XR Tee Jet XR11003 nozzle had significantly lower height than untreated. On the second rating date, June 22nd, turfgrass treated with Primo MAXX at 0.25 oz/M with a Turf Jet 1/4TT J04 nozzle, Primo MAXX at 0.125 oz/M with an AL Tee Jet AI 11003 nozzle, Primo MAXX at 0.25 oz/M with an AL Tee Jet AI 11003 nozzle, Primo MAXX at 0.125 oz/M with an TUR Tee Jet TT 11003 nozzle, Primo MAXX at 0.25 oz/M with an TUR Tee Jet TT 11003 nozzle, Primo MAXX at 0.125 oz/M with an XR Tee Jet XR 11004 nozzle, Primo MAXX at 0.25 oz/M with an TUR Tee Jet TT 11006 nozzle, Primo WSB at 0.0625 oz/M with an XR Tee Jet XR 11003 nozzle had significantly lower height than untreated. On the July 7th rating date, turfgrass treated with Primo MAXX at 0.25 oz/M with an TUR Tee Jet TT 11006 nozzle, Primo WSB at 0.125 oz/M with an XR Tee Jet XR 11003 nozzle had significantly lower height. Finally, on the July 12th rating date, turfgrass treated with Primo MAXX at 0.25 oz/M with a Turf Jet 1/4TT J04 nozzle, Primo MAXX at 0.25 oz/M with an XR Turf Jet XR 1104 nozzle, Primo MAXX at 0.25 oz/M with a TUR Tee Jet TT 11006 nozzle, Primo WSB at 0.0625 oz/M with an XR Tee Jet XR 11003 nozzle, and Primo WSB at 0.125 oz/M with an XR Tee Jet XR 11003 nozzle had significantly less height than untreated.

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Turfgrass fresh clipping weights were collected five times during the study (Table 3). On the first rating date, June 22nd, all treated turfgrass had significantly less clipping weight than untreated. On the second rating date, June 30th, all treated turfgrass except Primo WSB at 0.0625 oz/M with an XR Tee Jet XR 11003 nozzle had significantly less clipping weight than untreated. On the July 7th rating date, turfgrass treated with Primo MAXX at 0.25 oz/M with a Turf Jet 1/4TT J04 nozzle, Primo MAXX at 0.125 oz/M with a TUR Tee Jet TT 11003 nozzle, Primo MAXX at 0.25 oz/M with an XR Tee Jet XR 11004 nozzle, Primo MAXX at 0.125 oz/M with an XR Tee Jet XR 11003 nozzle, Primo MAXX at 0.25 oz/M with an XR Tee Jet XR 11003 nozzle, Primo MAXX at 0.125 oz/M with a TUR Tee Jet TT 11006 nozzle, and Primo WSB at 0.125 oz/M with an XR Tee Jet XR 11003 nozzle had significantly less clipping weight than untreated. Finally, on the July 12th rating date, turfgrass treated with Primo MAXX at 0.125 oz/M with an XR Tee Jet XR 11003 nozzle had significantly less clipping weight than untreated.

Table 1. Color ratings on a scale of 0-10 where 0 = brown, 7= acceptable, and 10 = dark green of PGR's applied to creeping bentgrass taken in 2005.

Treatment	Form	Rate oz/M	6-15		6-30		7-12		7-28	
			6-22	7-7	7-20	7-20	7-20	7-20		
PRIMO MAXX	1MEC	0.125	8.0	8.3	8.2	8.3	8.3	8.0	8.3	
<u>TURF JET 1/4TT JO4 (2.8) XC¹</u>										
PRIMO MAXX	1MEC	0.25	8.0	8.5	8.5	8.5	8.2	8.0	8.7	
<u>TURF JET 1/4TT JO4 (2.8) XC</u>										
PRIMO MAXX	1MEC	0.125	7.8	8.3	8.3	8.7	8.3	8.3	8.8	
<u>AL TEEJET AI11003 (2.0) VC</u>										
PRIMO MAXX	1MEC	0.25	8.0	8.5	8.7	8.5	8.2	8.2	8.8	
<u>AL TEEJET AI11003 (2.0) VC</u>										
PRIMO MAXX	1MEC	0.125	8.0	8.2	8.5	8.8	8.7	8.2	8.7	
<u>TUR TEEJET TT11003 (2.0) C</u>										
PRIMO MAXX	1MEC	0.25	8.3	8.3	8.3	8.7	8.3	8.5	8.7	
<u>TUR TEEJET TT11003 (2.0) C</u>										
PRIMO MAXX	1MEC	0.125	8.0	8.7	8.7	8.5	8.7	8.3	8.7	
<u>XR TEEJET XR11004 (2.8) M</u>										
CHECK			8.0	8.8	8.3	8.2	8.2	8.2	8.3	
PRIMO MAXX	1MEC	0.25	8.0	8.3	8.7	8.5	8.0	8.2	8.5	
<u>XR TEEJET XR11004 (2.8) M</u>										
PRIMO MAXX	1MEC	0.125	8.0	8.3	8.2	8.7	8.8	8.5	9.0	
<u>XR TEEJET XR11003 (2.0) F</u>										
PRIMO MAXX	1MEC	0.25	8.0	8.8	8.8	9.0	8.8	8.2	8.5	
<u>XR TEEJET XR11003 (2.0) F</u>										
PRIMO MAXX	1MEC	0.25	8.0	9.0	8.8	8.5	8.3	8.2	8.8	
<u>TUR TEEJET TT11006 (2.0) XC</u>										
PRIMO MAXX	1MEC	0.125	8.0	8.8	8.5	8.5	8.3	8.2	8.5	
<u>TUR TEEJET TT11006 (2.0) XC</u>										
PRIMO WSB	WS	0.0625	8.2	8.7	8.5	8.5	8.3	8.3	8.5	
<u>XR TEEJET XR11003 (2.0) C</u>										
PRIMO WSB	WS	0.125	8.0	8.7	8.7	8.7	8.7	8.2	8.7	
<u>XR TEEJET XR11003 (2.0) C</u>										

1 – Nozzle type (ground speed mph) droplet size where XC = extra coarse, VC = very coarse, C = coarse, M = medium, and F = fine.

Table 2. Height ratings (in inches) of PGR's applied to creeping bentgrass taken in 2005.

Treatment	Form	Rate oz/M	6-15	6-22	6-30	7-7	7-12	7-20	7-28
PRIMO MAXX	1MEC	0.125	0.41ab ²	0.39ab	0.39ab	0.39ab	0.39abc	0.54a	0.51ab
<u>TURF JET 1/4TT JO4 (2.8) XC¹</u>									
PRIMO MAXX	1MEC	0.25	0.39ab	0.38b	0.39ab	0.38abc	0.37bc	0.51ab	0.51ab
<u>TURF JET 1/4TT JO4 (2.8) XC</u>									
PRIMO MAXX	1MEC	0.125	0.38ab	0.36b	0.38ab	0.38abc	0.38abc	0.51ab	0.51ab
<u>AL TEEJET AI11003 (2.0) VC</u>									
PRIMO MAXX	1MEC	0.25	0.38ab	0.38b	0.37ab	0.39abc	0.39abc	0.52ab	0.53ab
<u>AL TEEJET AI11003 (2.0) VC</u>									
PRIMO MAXX	1MEC	0.125	0.38ab	0.38b	0.35b	0.38abc	0.39abc	0.52ab	0.54a
<u>TUR TEEJET TT11003 (2.0) C</u>									
PRIMO MAXX	1MEC	0.25	0.39ab	0.37b	0.39ab	0.4a	0.4ab	0.51ab	0.51ab
<u>TUR TEEJET TT11003 (2.0) C</u>									
PRIMO MAXX	1MEC	0.125	0.38ab	0.37b	0.37ab	0.39abc	0.38abc	0.52ab	0.51ab
<u>XR TEEJET XR11004 (2.8) M</u>									
CHECK			0.42a	0.42a	0.39ab	0.4a	0.41a	0.51ab	0.51ab
PRIMO MAXX	1MEC	0.25	0.38ab	0.38ab	0.38ab	0.37abc	0.37bc	0.52ab	0.53ab
<u>XR TEEJET XR11004 (2.8) M</u>									
PRIMO MAXX	1MEC	0.125	0.37b	0.38ab	0.39ab	0.38abc	0.39abc	0.55a	0.53ab
<u>XR TEEJET XR11003 (2.0) F</u>									
PRIMO MAXX	1MEC	0.25	0.39ab	0.39ab	0.39ab	0.38abc	0.38abc	0.53ab	0.51ab
<u>XR TEEJET XR11003 (2.0) F</u>									
PRIMO MAXX	1MEC	0.25	0.38ab	0.38b	0.38ab	0.37bc	0.37bc	0.53ab	0.52ab
<u>TUR TEEJET TT11006 (2.0) XC</u>									
PRIMO MAXX	1MEC	0.125	0.39ab	0.39ab	0.38ab	0.4a	0.41a	0.52ab	0.51ab
<u>TUR TEEJET TT11006 (2.0) XC</u>									
PRIMO WSB	WS	0.0625	0.39ab	0.38b	0.41a	0.38abc	0.37bc	0.47b	0.49ab
<u>XR TEEJET XR11003 (2.0) C</u>									
PRIMO WSB	WS	0.125	0.38ab	0.39ab	0.39ab	0.36c	0.36c	0.51ab	0.49b
<u>XR TEEJET XR11003 (2.0) C</u>									

1 - Nozzle type (ground speed mph) droplet size where XC = extra coarse, VC = very coarse, C = coarse, M = medium, and F = fine.

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

Table 3. Fresh clipping weight (grams) of creeping bentgrass taken in 2005.

Treatment	Form	Rate oz/M	6-22	6-30	7-7	7-12	7-20
PRIMO MAXX	IMEC	0.125	5.4bc ²	7.5bc	3.6ab	6.3ab	29.6a
<u>TURF JET 1/4TT JO4 (2.8) XC¹</u>							
PRIMO MAXX	IMEC	0.25	4.7bc	5.7c	2.9b	4.7ab	33.3a
<u>TURF JET 1/4TT JO4 (2.8) XC</u>							
PRIMO MAXX	IMEC	0.125	3.9c	7.2bc	3.9ab	5.2ab	27.3a
<u>AL TEEJET AI11003 (2.0) VC</u>							
PRIMO MAXX	IMEC	0.25	5.2bc	6.1c	3.2ab	5.9ab	37.2a
<u>AL TEEJET AI11003 (2.0) VC</u>							
PRIMO MAXX	IMEC	0.125	3.6c	5.7c	2.9b	6.0ab	33.9a
<u>TUR TEEJET TT11003 (2.0) C</u>							
PRIMO MAXX	IMEC	0.25	6.1bc	8.3bc	4.1ab	6.1ab	39.4a
<u>TUR TEEJET TT11003 (2.0) C</u>							
PRIMO MAXX	IMEC	0.125	7.3bc	9.3bc	4.1ab	6.3ab	42.2a
<u>XR TEEJET XR11004 (2.8) M</u>							
CHECK			14.3a	15.7a	5.7a	7.8a	37.6a
PRIMO MAXX	IMEC	0.25	4.2c	6.0c	2.8b	5.8ab	33.1a
<u>XR TEEJET XR11004 (2.8) M</u>							
PRIMO MAXX	IMEC	0.125	3.7c	5.4c	2.4b	4.1b	29.9a
<u>XR TEEJET XR11003 (2.0) F</u>							
PRIMO MAXX	IMEC	0.25	4.8bc	6.2c	2.8b	5.3ab	36.6a
<u>XR TEEJET XR11003 (2.0) F</u>							
PRIMO MAXX	IMEC	0.25	8.1b	8.3bc	3.7ab	6.3ab	40.1a
<u>TUR TEEJET TT11006 (2.0) XC</u>							
PRIMO MAXX	IMEC	0.125	7.0bc	7.5c	2.7b	4.9ab	34.4a
<u>TUR TEEJET TT11006 (2.0) XC</u>							
PRIMO WSB	WS	0.0625	8.3b	11.8ab	3.6ab	4.7ab	28.9a
<u>XR TEEJET XR11003 (2.0) C</u>							
PRIMO WSB	WS	0.125	5.6bc	6.5bc	2.6b	5.2ab	31.0a
<u>XR TEEJET XR11003 (2.0) C</u>							

1 – Nozzle type (ground speed mph) droplet size where XC = extra coarse, VC = very coarse, C = coarse, M = medium, and F = fine.

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