

Evaluation of Foliarly Applied Nutrient Sources, Primer Wetting Agent and Paclobutrazol for Creeping Bentgrass Fairway Management, 2003

Cale Bigelow, Glenn Hardebeck, and Kristie Walker

Objective:

To evaluate the effectiveness of various combinations of foliarly applied nutrient sources, a wetting agent, and a growth regulator for the management of a creeping bentgrass fairway.

How it Was Done:

Treatments were applied with a CO₂ pressurized sprayer (32 psi) equipped with an 8004 flat fan nozzle and calibrated to deliver 50 gallons of water per acre. All treatments were initiated on 15 May, 2003 and re-applied on 14 day intervals ending on 19 Aug., 2003. Total season N applications for the foliarly applied urea applications were equivalent to 1.8 lbs. of N per 1000 ft². Following the morning treatment applications the area received ¼ inch of irrigation from an overhead irrigation system. The area was established with 'L-93' creeping bentgrass in fall 2002. Turf was maintained at 1/2 in. and fertilized with 2.0 lb N/1000 sq ft in the autumn of 2002 and early spring 2003. Plots were 5 ft x 5 ft, and were arranged in a randomized complete block with four replications. Turfgrass quality was rated visually on a 0 to 10 scale where 0 = turf brown; 7.5 = minimum acceptable level of quality for a golf course fairway, and 10 = optimum greenness and density. Color was rated on a 1 to 9 scale where 1 = brown turf and 9 = dark green turf. Dollar spot was assessed by counting the number of infection centers per plot. Due to abundant natural rainfall during 2003, the site was infrequently irrigated and soil moisture was maintained at or near field capacity throughout the study. Data were subjected to analysis of variance and means separated at (p=0.05) using the LSD t-test.

Results to Date:

- Visual turfgrass quality varied considerably due to treatment effects with the greatest noticeable effects from 18 July through the end of the study (Table 1). As expected, treatment combinations containing Trimmit (8 oz / A) + 0.2 lb of N from urea, and occasionally Sprint 330 iron, applied every 14 days provided a very good (ratings > 8.0) overall appearance throughout the study, compared to untreated plots and when urea was applied alone. Plots treated with Daconil Ultrex (3.2 oz / 1000 ft²) also provided very good consistent turfgrass quality. Primer wetting agent alone did very little to increase turfgrass quality.
- Turfgrass color (Table 2) was consistently enhanced on at least 7 of the 8 rating dates when Trimmit was combined with urea or iron, compared to untreated, urea or iron treated plots. By comparison Trimmit alone or with Primer only had better color than the untreated on 5 or 6 of the eight rating dates respectively.
- Dollar spot incidence was very slight throughout the study (Table 3). By 15 Aug., however, treatment difference were noticeable. The repeated Trimmit applications when combined with Primer, urea, Sprint 330 provided dollar spot suppression rates similar to Daconil Ultrex on all rating dates from 15 Aug. to 9 Sept.

- On several dates the very slight negative effects of repeated Trimit applications were noticeable (Table 4). Turf responded to these repeated applications by with a slight browning of leaf margins and a minor overall bronzing of the plot.

Acknowledgments:

This research was supported by the Midwest Regional Turf Foundation.

Table 1. Turfgrass quality of ‘L-93’ creeping bentgrass as affected by Primer wetting agent, Daconil, Trimmit and other product applications.

Treatment ^b	Rate	Turfgrass quality ^a										
		21 May	30 May	8 June	18 June	23 June	27 June	18 July	4 Aug.	9 Aug.	13 Aug.	22 Aug.
----- (0-10 scale) -----												
Trimmit 2SC	8.0 oz / A	9.0 ab	8.8 abcd	8.1 d	9.0 a	8.5 def	8.6 b	7.3 def	8.1 c	7.3 h	7.9 cde	7.9 cd
Primer Select	3.0 oz / 1000 ft ²	8.9 b	8.6 cd	8.8 ab	8.3 b	7.9 g	8.5 bc	7.2 f	8.0 c	7.7 fgh	7.8 cde	7.7 cd
Sprint 330	4.0 oz / 1000ft ²	8.9 b	8.6 bcd	9.0 a	8.4 b	8.4 ef	8.5 bc	7.5 abcde	8.0 c	8.0 defg	7.7 cde	7.7 cd
Urea	0.2 # N/1000 ft ²	9.1 ab	9.0 abc	9.0 a	8.4 b	8.4 ef	8.6 b	7.4 cdef	8.0 c	8.4 bcde	8.0 cd	7.8 cd
Lesco’s 12-0-0	4.0 oz/1000 ft ²	9.1 ab	8.9 abcd	9.0 a	8.5 b	8.8 cde	8.5 bc	7.7 ab	8.0 c	7.6 fgh	7.5 e	7.0 e
Trimmit + Primer	8.0 oz + 3.0 oz	9.0 ab	8.8 abcd	8.3 cd	9.0 a	8.5 def	8.5 bc	7.3 def	8.1 bc	7.5 gh	8.0 c	8.0 bc
Trimmit + Primer + Sprint 330	8.0 oz + 3.0 oz + 4.0 oz	9.3 ab	8.9 abcd	8.4 bcd	8.9 a	8.9 bcd	9.0 a	7.6 abc	8.2 bc	7.6 fgh	8.0 c	8.6 ab
Trimmit + Primer + Sprint + Urea	8.0 oz + 3.0 oz + 4.0 oz + 0.2 # N	9.1ab	9.1 a	8.6 abc	9.0 a	8.9 bcd	8.8 ab	7.3 cdef	8.6 a	9.0 a	8.8 a	8.9 a
Trimmit + Sprint	8.0 oz + 4.0 oz	8.9 b	8.9 abcd	8.3 cd	9.0 a	9.3 ab	8.6 b	7.7 ab	8.5 ab	8.0 defg	8.1 bc	8.1 bc
Primer + Urea	3.0 oz + 0.2 # N	9.1 ab	8.9 abcd	9.0 a	8.4 b	8.3 fg	8.5 bc	7.2 ef	7.9 c	8.1 cdef	7.7 cde	7.6 cde
Trimmit + Urea	8.0 oz + 0.2 # N	9.1 ab	9.0 ab	8.6 abc	9.0 a	9.4 a	8.6 b	7.3 cdef	8.5 ab	8.6 abc	8.8 a	8.6 ab
Trimmit + Urea + Sprint	8.0 oz + 0.2 # N + 3.0 oz	9.1 ab	9.1 a	9.0 a	9.0 a	9.1 abc	8.6 b	7.8 a	8.6 a	8.8 ab	8.7 a	8.8 a
Primer + Sprint	3.0 oz + 4.0 oz	9.1 ab	8.5 d	8.9 a	8.3 b	8.4 ef	8.4 c	7.6 abcd	7.9 c	7.8 fg	7.6 de	7.3 de
Daconil Ultrex	3.2 oz / 1000 ft ²	9.4 a	8.9 abcd	8.9 a	8.4 b	8.8 cde	8.7 b	7.8 a	8.1 bc	8.4 bcd	8.5 ab	8.5 ab
Untreated	---	9.3 ab	8.6 d	8.8 a	8.4 b	8.4 def	8.5 bc	7.4 bcdef	8.0 c	7.9 efg	7.7 cde	7.3 de

^a Visual turfgrass quality was rated on a scale of 0 to 10 where 0 is brown, dead turf and 10 is dark green ideal turf; acceptable fairway quality ≥ 7.5 .

^b Treatments were applied on a 14 day interval beginning on 15 May and ending 18 Aug., 2003.

Table 2. Turfgrass Color of ‘L-93’ creeping bentgrass as affected by Primer wetting agent, Daconil, Trimmit and other product applications.

Treatment ^b	Rate	Turfgrass color ^a							
		30 May	8 June	18 June	23 June	27 June	4 Aug.	13 Aug.	22 Aug.
----- (0-10 scale) -----									
Trimmit 2SC	8.0 oz / A	8.9 bc	8.9 a	8.7 bc	8.8 cd	8.6 bc	8.2 cd	8.5 b	8.5 ab
Primer Select	3.0 oz / 1000 ft ²	8.3 e	7.9 c	8.0 e	8.0 f	8.5 c	7.8 e	8.0 d	7.6 de
Sprint 330	4.0 oz / 1000ft ²	8.8 bcd	8.3 b	8.0 e	8.5 de	8.5 c	7.9 de	8.0 d	8.0 c
Urea	0.2 # N/1000 ft ²	8.6 cd	8.1 bc	8.0 e	8.3 ef	8.5 c	7.6 e	8.2 c	8.1 c
Lesco’s 12-0-0	4.0 oz/1000 ft ²	8.7 bcd	8.1 bc	8.0 e	8.5 de	8.5 c	7.9 de	8.0 d	8.1 c
Trimmit + Primer	8.0 oz + 3.0 oz	8.7 bcd	8.9 a	8.6 c	8.4 def	8.5 c	8.6 ab	8.5 b	8.6 ab
Trimmit + Primer + Sprint 330	8.0 oz + 3.0 oz + 4.0 oz	9.5 a	9.0 a	9.0 a	9.4 ab	8.8 ab	8.6 ab	8.5 b	8.8 ab
Trimmit + Primer + Sprint + Urea	8.0 oz + 3.0 oz + 4.0 oz + 0.2 # N	9.4 a	9.0 a	8.9 ab	9.1 abc	8.9 a	8.9 a	8.8 a	8.8 ab
Trimmit + Sprint	8.0 oz + 4.0 oz	9.4 a	9.0 a	9.0 a	9.1 abc	8.5 c	8.5 bc	8.5 b	8.5 ab
Primer + Urea	3.0 oz + 0.2 # N	8.5 de	8.0 bc	8.3 d	8.0 f	8.5 c	7.6 e	8.0 d	7.8 cde
Trimmit + Urea	8.0 oz + 0.2 # N	9.4 a	9.0 a	9.0 a	9.0 bc	8.6 bc	8.8 ab	8.7 a	8.5 b
Trimmit + Urea + Sprint	8.0 oz + 0.2 # N + 3.0 oz	9.0 b	9.0 a	9.0 a	9.5 a	8.6 bc	8.6 ab	8.7 a	8.8 a
Primer + Sprint	3.0 oz + 4.0 oz	8.5 de	8.1 bc	8.1 de	8.0 f	8.5 c	7.8 e	8.0 d	7.5 e
Daconil Ultrex	3.2 oz / 1000 ft ²	8.5 de	8.0 bc	8.0 e	8.0 f	8.5 c	7.8 e	8.2 c	7.9 cd
Untreated	---	8.5 de	8.1 bc	8.0 e	8.2 ef	8.5 c	7.9 de	8.0 cd	7.9 cd

^a Visual turfgrass quality was rated on a scale of 0 to 10 where 0 is brown, dead turf and 10 is dark green ideal turf; acceptable fairway quality ≥ 7.5 .

^b Treatments were applied on a 14 day interval beginning on 15 May and ending 18 Aug., 2003.

Table 3. Dollar spot of 'L-93' creeping bentgrass as affected by Primer wetting agent, Daconil, Trimmit and other product applications.

Treatment ^a	Rate	Dollar spot									
		23 June	18 July	4 Aug.	6 Aug.	11 Aug.	15 Aug.	18 Aug.	22 Aug.	25 Aug.	9 Sept.
----- lesions per plot -----											
Trimmit 2SC	8.0 oz / A	0.0 a	0.0 b	1.3 bc	0.8 bc	1.0 b	1.3 cde	2.5 cd	1.5 cd	1.0 cd	3.5 cd
Primer Select	3.0 oz / 1000 ft ²	0.3 a	0.0 b	3.8 ab	3.8 a	3.0 ab	4.5 abcd	6.5 abc	5.8 abc	5.0 ab	6.3 bcd
Sprint 330	4.0 oz / 1000ft ²	0.0 a	0.0 b	3.8 ab	3.0 ab	5.0 a	6.5 ab	8.8 a	8.0 ab	6.8 ab	10.8 ab
Urea	0.2 # N/1000 ft ²	0.0 a	0.0 b	2.8 abc	1.8 abc	1.8 b	2.8 bcde	3.8 bcd	3.8 bcd	3.8 bc	3.3 cd
Lesco's 12-0-0	4.0 oz/1000 ft ²	0.3 a	0.5 a	5.3 a	3.5 a	5.0 a	7.8 a	8.8 a	10.5 a	8.3 a	14.0 a
Trimmit + Primer	8.0 oz + 3.0 oz	0.5 a	0.0 b	1.3 bc	0.8 bc	0.3 b	0.3 e	0.8 d	0.8 d	0.0 d	1.0 d
Trimmit + Primer + Sprint 330	8.0 oz + 3.0 oz + 4.0 oz	0.0 a	0.0 b	0.5 c	0.0 c	0.0 b	0.8 de	0.8 d	0.0 d	0.0 d	0.8 d
Trimmit + Primer + Sprint + Urea	8.0 oz + 3.0 oz + 4.0 oz + 0.2 # N	0.0 a	0.0 b	0.0 c	0.0 c	0.0 b	0.3 e	0.3 d	0.0 d	0.0 d	0.0 d
Trimmit + Sprint	8.0 oz + 4.0 oz	0.0 a	0.0 b	0.8 c	0.3 c	0.3 b	0.5 e	1.0 d	0.0 d	0.3 cd	1.5 d
Primer + Urea	3.0 oz + 0.2 # N	0.0 a	0.0 b	1.8 bc	1.3 abc	1.5 b	5.0 abc	4.5 abcd	3.5 bcd	5.3 ab	6.0 bcd
Trimmit + Urea	8.0 oz + 0.2 # N	0.0 a	0.0 b	0.0 c	0.0 c	0.0 b	0.0 e	1.3 d	0.0 d	0.0 d	0.0 d
Trimmit + Urea + Sprint	8.0 oz + 0.2 # N + 3.0 oz	0.0 a	0.0 b	0.0 c	0.0 c	0.0 b	0.3 e	0.3 d	0.0 d	0.3 cd	0.5 d
Primer + Sprint	3.0 oz + 4.0 oz	0.5 a	0.0 b	4.0 ab	2.5 abc	5.0 a	6.5 ab	7.5 ab	6.3 abc	6.3 ab	12.0 ab
Daconil Ultrex	3.2 oz / 1000 ft ²	0.0 a	0.0 b	0.0 c	0.0 c	0.0 b	0.0 e	0.0 d	0.0 d	0.0 d	0.8 d
Untreated	---	0.0 a	0.0 b	2.6 abc	3.5 a	3.1 ab	4.8 abc	6.5 abc	5.8 abc	5.0 ab	9.8 abc

^a Treatments were applied on a 14 day interval beginning on 15 May and ending 18 Aug., 2003.

Table 4. Phytotoxicity of 'L-93' creeping bentgrass as affected by Primer wetting agent, Daconil, Trimmit and other product applications.

Phytotoxicity ^a				
Treatment ^b	Rate	8 June	6 Aug.	13 Aug.
		----- (0-5 scale) -----		
Trimmit 2SC	8.0 oz / A	0.3 a	0.5 b	0.4 a
Primer Select	3.0 oz / 1000 ft ²	0.0 d	0.0 c	0.0 c
Sprint 330	4.0 oz / 1000ft ²	0.0 d	0.0 c	0.0 c
Urea	0.2 # N/1000 ft ²	0.0 d	0.0 c	0.0 c
Lesco's 12-0-0	4.0 oz/1000 ft ²	0.0 d	0.0 c	0.0 c
Trimmit + Primer	8.0 oz + 3.0 oz	0.3 ab	0.5 b	0.3 ab
Trimmit + Primer + Sprint 330	8.0 oz + 3.0 oz + 4.0 oz	0.2 bc	1.3 a	0.4 ab
Trimmit + Primer + Sprint + Urea	8.0 oz + 3.0 oz + 4.0 oz + 0.2 # N	0.0 d	0.0 c	0.1 c
Trimmit + Sprint	8.0 oz + 4.0 oz	0.3 a	0.7 b	0.3 b
Primer + Urea	3.0 oz + 0.2 # N	0.0 d	0.0 c	0.0 c
Trimmit + Urea	8.0 oz + 0.2 # N	0.1 cd	0.0 c	0.1 c
Trimmit + Urea + Sprint	8.0 oz + 0.2 # N + 3.0 oz	0.1 cd	0.0 c	0.0 c
Primer + Sprint	3.0 oz + 4.0 oz	0.0 d	0.0 c	0.0 c
Daconil Ultrex	3.2 oz / 1000 ft ²	0.0 d	0.0 c	0.0 c
Untreated	---	0.0 d	0.0 c	0.0 c

^a Visual turfgrass quality was rated on a scale of 0 to 10 where 0 is brown, dead turf and 10 is dark green ideal turf; acceptable fairway quality ≥ 7.5 .

^b Treatments were applied on a 14 day interval beginning on 15 May and ending 18 Aug., 2003.