

## **Creeping Bentgrass Putting Green Turf Response to Granular and Foliar Nitrogen Programs, 2003**

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### **Objective:**

To evaluate various foliar vs. granular fertilizer programs for creeping bentgrass summer putting green quality.

### **How it Was Done:**

Since many golf course managers use foliar nitrogen (N) fertilization through the summer months several potential putting green fertilization programs were developed to evaluate this practice compared to a traditional slow release granular source (Nutralene). This study was conducted at the W.H. Daniel Turfgrass Research and Diagnostic Center from May through early August on an existing six year old Pennlinks bentgrass research green. Iron (Fe) and sucrose were included with some N treatments. Iron (Sprint 330) was used because it enhances turfgrass color without a growth surge and sucrose was included because numerous anecdotal reports suggest its benefit to the soil microorganisms. The long-term effect of frequent sucrose applications on the soil carbon to nitrogen ratio are unclear. One possible benefit, however, may be that the applications may enhance N immobilization which would reduce N losses. A theoretical complex polyphenol solution was also tested for its potential in putting green turf management.

### **Results to Date:**

- The granular fertilizer treatments provided superior initial overall quality and color following the first 0.5 lb. N application, a trend which persisted throughout the remainder of the experiment.
- As expected when N was combined with iron there was a strong increase in the visual appearance of the plots.
- Iron applications alone provided unacceptable turf and these plots were prone to infection by dollar spot and brown patch
- Overall foliar N treatments did not provide as good a level of quality and color as the granular product. The exception occurred when the granular product seemed to lose its effect and a repeat 28 day application was applied (Table 1, 20 June)
- The addition of sucrose (table sugar) to the N sources did not seem to dramatically affect turf quality, color or disease incidence.
- Future research will address the effect of these fertilizer programs on ball roll in addition to overall appearance.

### **Acknowledgments**

This research was supported by the Midwest Regional Turf Foundation.

Table 1. Visual quality of Pennlinks creeping bentgrass putting green turf as affected by various fertilizer programs, 2003.

Treatment <sup>a</sup>	Rate	Turfgrass quality <sup>b</sup>										
		21 May	26 May	1 June	7 June	20 June	27 June	1 July	10 July	28 July	4 Aug.	13 Aug.
	product / 1000 ft <sup>2</sup>	----- (0-10 scale) -----										
Urea	0.125 # N	8.0 c <sup>d</sup>	7.5 b	7.4 d	7.8 def	8.3 a	8.0 c	8.0 d	8.1 bc	7.0 a	8.2 cde	8.1 c
Foliar Iron (Fe)	2.0 oz	8.0 c	7.4 b	7.2 d	7.4 f	7.0 c	7.1 d	6.6 e	6.9 d	6.5 b	7.7 f	7.4 d
Urea + Fe	0.125 # N + 2.0 oz	8.1 bc	7.6 b	8.0 bc	8.1 bcd	8.1 ab	8.6 b	8.5 c	7.9 c	7.1 a	8.4 abcd	8.4 bc
Urea + Fe + Sucrose	0.125 # N + 2.0 oz + 0.25 #	8.1 bc	7.6 b	7.5 cd	7.9 cde	7.8 b	8.1 c	8.0 d	8.2 abc	7.0 a	8.2 de	8.1 c
Nutralene	0.5 # N	8.4 abc	8.4 a	8.9 a	8.3 abc	8.1 ab	9.0 ab	8.9 ab	8.2 abc	7.0 a	8.5 abc	8.7 ab
Nutralene + Sucrose	0.5 # N + 0.25 #	8.4 abc	8.4 a	8.4 ab	7.9 cde	8.1 ab	9.3 a	8.8 b	8.4 ab	6.9 ab	8.6 a	8.8 ab
Nutralene + Fe	0.5 # N + 2.0 oz	8.6 a	8.5 a	8.6 a	8.5 ab	8.3 a	9.1 a	9.0 a	8.4 ab	7.3 a	8.5 abc	8.9 a
Nutralene + Fe + Sucrose	0.5 # N + 2.0 oz + 0.25 #	8.5 ab	8.4 a	8.9 a	8.6 a	8.3 a	9.0 ab	9.1 a	8.5 a	7.2 a	8.5 ab	8.8 ab
Urea + Polyphenols <sup>c</sup>	0.125 # N + 30 oz	8.1 bc	7.4 b	7.1 d	7.5 ef	7.9 ab	8.0 c	7.9 d	8.1 bc	7.1 a	8.3 bcde	8.4 bc
Urea + Poly + Fe	0.125 # N + 30 oz + 2.0 oz	8.3 abc	7.4 b	7.5 cd	7.6 ef	7.8 b	8.2 c	8.0 d	8.0 c	6.9 ab	8.1 e	8.1 c

<sup>a</sup> All treatments were initially applied 16 May, Nutralene was applied every 28 days and foliar products (urea, iron, sucrose and polyphenols) applied on a 7-10 day interval in 2.5 gallons of water per 1000 ft<sup>2</sup> to a mature Pennlinks creeping bentgrass grown on a native soil, maintained at 0.14 inches.

<sup>b</sup> Quality was visually assessed on a 0 to 10 scale where 0 equals brown, dead turf, 7.5 = minimum acceptable level of color for a putting green and 10 equals optimum greenness, density and uniformity.

<sup>c</sup> Polyphenols were a novel blend of locally available humic substances extracted with hot water.

<sup>d</sup> Means in the same column with the same letter are not significantly different at P=0.05 according to the LSD t-test.

Table 2. Visual color ratings of a Pennlinks creeping bentgrass putting green turf as affected by various fertilizer programs, 2003.

Treatment <sup>a</sup>	Rate	Turfgrass color <sup>b</sup>									
		26 May	1 June	7 June	20 June	24 June	27 June	1 July	10 July	18 July	13 Aug.
product / 1000 ft <sup>2</sup>		----- (0-10 scale) -----									
Urea	0.125 # N	7.2 b <sup>d</sup>	7.3 d	7.4 de	7.9 a	8.0 c	8.0 d	7.6 de	7.6 cd	7.3 ab	7.9 b
Foliar Iron (Fe)	2.0 oz	7.6 b	7.5 d	7.4 de	7.3 b	6.8 d	6.8 e	7.5 e	7.4 d	6.9 b	7.9 b
Urea + Fe	0.125 # N + 2.0 oz	7.7 b	8.1 c	8.3 ab	7.6 ab	8.6 b	8.5 c	8.5 b	8.1 ab	7.5 a	8.3 b
Urea + Fe	0.125 # N + 2.0 oz	7.5 b	7.4 d	7.8 cd	8.0 a	8.6 b	8.6 c	8.1 bc	8.1 ab	7.3 ab	8.0 b
+ Sucrose	+ 0.25 #										
Nutralene	0.5 # N	7.7 b	8.4 bc	8.3 ab	8.0 a	9.3 a	9.1 b	9.1 a	8.4 ab	7.1 ab	8.8 a
Nutralene + Sucrose	0.5 # N + 0.25 #	8.8 a	8.6 ab	8.0 bc	8.1 a	9.5 a	9.5 a	9.3 a	8.4 ab	7.3 ab	9.0 a
Nutralene + Fe	0.5 # N + 2.0 oz	9.0 a	8.9 a	8.6 a	8.0 a	9.5 a	9.5 a	9.1 a	8.5 a	7.4 a	9.0 a
Nutralene + Fe	0.5 # N + 2.0 oz	8.9 a	8.8 ab	8.5 a	7.9 a	9.4 a	9.4 ab	9.0 a	8.4 ab	7.4 a	8.8 a
+ Sucrose	+ 0.25 #										
Urea + Polyphenols <sup>c</sup>	0.125 # N + 30 oz	7.5 b	7.3 d	7.3 e	7.8 ab	8.3 bc	8.1 d	8.1 bcd	8.1 ab	7.3 ab	8.3 b
Urea + Poly	0.125 # N + 30 oz	7.4 b	7.3 d	7.5 de	7.8 ab	8.1 c	8.1 d	7.9 cde	8.0 bc	7.3 ab	8.1 b
+ Fe	+ 2.0 oz										

<sup>a</sup> All treatments were initially applied 16 May, Nutralene was applied every 28 days and foliar products (urea, iron, sucrose and polyphenols) applied on a 7-10 day interval in 2.5 gallons of water per 1000 ft<sup>2</sup> to a mature Pennlinks creeping bentgrass grown on a native soil, maintained at 0.14 inches.

<sup>b</sup> Color was visually assessed on a 0 to 10 scale where 0 equals brown turf, 7.5 = minimum acceptable level of color and 10 equals optimum greenness.

<sup>c</sup> Polyphenols were a novel blend of locally available humic substances extracted with hot water.

<sup>d</sup> Means in the same column with the same letter are not significantly different at P=0.05 according to the LSD t-test

Table 3. Dollar spot and brown patch severity of Pennlinks creeping bentgrass putting green turf as affected by various fertilizer programs, 2003.

Treatment <sup>a</sup>	Rate	Dollar spot <sup>b</sup>							Brown patch	
		20 June	24 June	27 June	1 July	10 July	18 July	13 Aug.	10 July	18 July
	product / 1000 ft <sup>2</sup>	----- (number of lesions per plot) -----							----- (% of plot) -----	
Urea	0.125 # N	11.3 ab <sup>d</sup>	5.3 ab	6.8 a	13.8 ab	12.0 ab	25.0 abc	17.0 abc	3.0 ab	4.0 a
Foliar Iron (Fe)	2.0 oz	24.0 a	9.3 a	15.8 a	26.5 a	22.3 a	27.3 abc	14.8 bc	7.3 a	10.1 a
Urea + Fe	0.125 # N + 2.0 oz	9.3 b	2.5 b	7.0 a	8.3 ab	6.3 ab	17.3 bc	9.8 cd	4.0 ab	5.6 a
Urea + Fe + Sucrose	0.125 # N + 2.0 oz + 0.25 #	10.3 ab	2.8 b	11.3 a	11.8 ab	6.3 ab	22.8 bc	16.8 abc	4.0 ab	6.8 a
Nutralene	0.5 # N	6.0 b	2.0 b	7.3 a	10.8 ab	6.0 ab	18.5 bc	6.5 cd	3.3 ab	6.3 a
Nutralene + Sucrose	0.5 # N + 0.25 #	11.5 b	2.0 b	13.3 a	10.0 ab	3.8 b	14.8 bc	8.3 cd	2.0 ab	4.3 a
Nutralene + Fe	0.5 # N + 2.0 oz	7.8 b	1.8 b	4.8 a	9.0 ab	3.8 b	17.5 bc	7.5 cd	2.0 ab	2.5 a
Nutralene + Fe + Sucrose	0.5 # N + 2.0 oz + 0.25 #	3.0 b	0.3 b	3.3 a	3.4 b	5.0 ab	7.0 c	0.0 d	1.5 ab	2.5 a
Urea + Polyphenols <sup>c</sup>	0.125 # N + 30 oz	13.5 ab	5.3 ab	12.0 a	19.0 ab	16.5 ab	31.5 ab	21.8 ab	0.0 b	1.3 a
Urea + Poly + Fe	0.125 # N + 30 oz 2.0 oz	8.8 b	4.5 ab	9.8 a	14.3 ab	17.5 ab	45.7 a	26.8 a	4.5 ab	5.8 a

<sup>a</sup> All treatments were initially applied 16 May, Nutralene was applied every 28 days and foliar products (urea, iron, sucrose and polyphenols) applied on a 7-10 day interval in 2.5 gallons of water per 1000 ft<sup>2</sup> to a mature Pennlinks creeping bentgrass grown on a native soil, maintained at 0.14 inches.

<sup>b</sup> Dollar spot severity was rated as the number of lesions or infection centers present in each plot, Brown patch was rated on a 0-100% of plot area affected.

<sup>c</sup> Polyphenols were a novel blend of locally available humic substances extracted with hot water.

<sup>d</sup> Means in the same column with the same letter are not significantly different at P=0.05 according to the LSD t-test.