

SMS Surfactant Trials, 2010

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Methods: Four direct comparisons were made on a sand based creeping bentgrass tee at Bellewood Golf Club located in Pottstown, PA. The turfgrass was comprised of mature PennTrio creeping bentgrass. This area has inadequate irrigation coverage and is prone to severe localized drying. As most, soils, however, it is not uniform.

Treatments application dates are noted in individual tables. Treatments were applied using a CO₂ pressurized sprayer at 38 psi and calibrated to deliver 88 gallons of water per acre. All treatments were immediately watered into the turfgrass using 0.25 inches of water from a hose with a meter. No treatment induced injury or phytotoxicity was observed.

Weather for the trial period was marked by prolonged dry periods with above average temperatures. The plots were irrigated to replace approximately 50% of evapotranspiration and severe drought was observed in the trial area.

Plots were visually rated for color, quality and % LDS. Turfgrass color on 0-10 scale where 5= color of untreated turf and 10= optimal color. Turfgrass quality on 0-10 scale where 7= color of untreated turf and 10= optimal quality. Percent localized dry spot (%LDS) was rated on a 0 to 100 scale where 0= none and 100= entire plot area symptomatic of dry spot. NDVI was measured using Spectrum Technologies Turf color meter. Water drop penetration test was performed at 0 (soil interface), 1, 2, 3, 4, 5, and 6 cm depth. Three cores per plot were used. The cores were allowed to air dry for 10-12 days prior to drop test. Droplets that did not penetrate the core for 10 minutes (600 seconds) were recorded as >600 seconds. Percent Volumetric Water (%VWC) were collected from each plot using a Spectrum Technologies TDR moisture meter. Five measurements per plot were be taken weekly at both 1.5 and 3.0 inches depth. Data were subject to ANOVA and separated using Tukey's test (p=0.05).

Comparison of SMS200,1388 and Duplex: These data are shown in tables 1-9. There was few differences among these treatments and the untreated control on any measurement date. There was a few trends to discuss. On 10 and 18 August, at 1 cm all treated plots had slightly quicker water penetration. There was a trend on 10 August at 2 cm depth in which plots treated with SMS200 and 1388 had agronomically quicker water penetration when compared to Duplex. By 11 September there was few differences or trends observed.

Table 20 show %VWC for this trial on 10 August, all treated plots had higher levels of water content when compared to the untreated and the highest levels were observed in plots treated with SMS200, followed by 1388 followed by Duplex.

Table 1. Comparison of SMS 200, 1388, and Duplex: Water drop penetration test: 29 July 2010

Rating Date				29 July 2010 (Initial)						
Rating Type				Seconds to penetrate soil at various depth***						
Depth				0 cm	1 cm	2 cm	3 cm	4 cm	5 cm	6 cm
Trt No.	Treatment* Name	Rate per A	Appl Code							
1	Untreated			101.0 a	58.3 a	43.3 a	16.0 a	3.7 a	2.3 a	1.3 a
2	SMS-200	20	A	63.7 a	45.7 a	29.3 a	15.0 a	4.3 a	1.0 a	1.0 a
3	SMS-EXP-1388	20	A	59.7 a	49.7 a	35.3 a	16.0 a	6.0 a	1.0 a	1.0 a
4	DuPlex	34	A	74.0 a	61.7 a	40.7 a	20.0 a	3.7 a	2.7 a	3.3 a
Treatment Prob(F)				0.1023	0.4587	0.1759	0.9119	0.7102	0.6491	0.4547

* Treatments were applied on 29 July (A) 2010

** Means followed by same letter do not significantly differ (P=.05, Tukey's HSD).

*** Water drop penetration test at 0 (soil interface), 1, 2, 3, 4, 5, and 6 cm depth. Three cores per plot were used. The cores were allowed to air dry for 10-12 days prior to drop test. Droplets that did not penetrate the core for 10 minutes (600 seconds) were recorded as >600 seconds.

Table 2. Continued: 18 August 2010

Rating Date				18 August						
Rating Type				Seconds to penetrate soil at various depth***						
Depth				0 cm	1 cm	2 cm	3 cm	4 cm	5 cm	6 cm
Trt No.	Treatment* Name	Rate per A	Appl Code							
1	Untreated			180.97 ab	110.42 a	108.52 a	110.02 a	102.92 a	66.19 a	52.26 a
2	SMS-200	20	A	107.73 b	35.14 a	55.88 ab	81.19 a	116.83 a	106.59 a	92.95 a
3	SMS-EXP-1388	20	A	215.47 a	56.61 a	24.59 b	106.11 a	128.47 a	122.52 a	116.83 a
4	DuPlex	34	A	144.90 ab	53.85 a	39.07 b	48.52 a	94.42 a	76.69 a	9.85 a
Treatment Prob(F)				0.0330	0.1719	0.0183	0.3787	0.8616	0.5770	0.1651

* Treatments were applied on 29 July (A)

** Means followed by same letter do not significantly differ (P=.05, Tukey's HSD).

*** Water drop penetration test at 0 (soil interface), 1, 2, 3, 4, 5, and 6 cm depth. Three cores per plot were used. The cores were allowed to air dry for 10-12 days prior to drop test. Droplets that did not penetrate the core for 10 minutes (600 seconds) were recorded as >600 seconds.

Table 3. Continued: 11 September 2010

Rating Date				11 September						
Rating Type				Seconds to penetrate soil at various depth***						
Depth				0 cm	1 cm	2 cm	3 cm	4 cm	5 cm	6 cm*
Trt No.	Treatment* Name	Rate per A	Appl Code							
1	Untreated			55.78 a	31.90 b	22.90 b	32.16 b	22.78 a	14.07 a	
2	SMS-200	20	A	117.30 a	89.50 a	69.30 ab	68.16 ab	83.85 a	20.85 a	
3	SMS-EXP-1388	20	A	129.19 a	35.90 ab	109.23 a	120.73 a	82.26 a	81.83 a	
4	DuPlex	34	A	62.73 a	34.54 b	47.73 b	81.78 ab	97.59 a	60.80 a	
Treatment Prob(F)				0.0979	0.0292	0.0110	0.0090	0.0567	0.0620	

* Treatments were applied on 29 July (A)

** Means followed by same letter do not significantly differ (P=.05, Tukey's HSD).

*** Water drop penetration test at 0 (soil interface), 1, 2, 3, 4, 5, and 6 cm depth. Three cores per plot were used. The cores were allowed to air dry for 10-12 days prior to drop test. Droplets that did not penetrate the core for 10 minutes (600 seconds) were recorded as >600 seconds.

* Data missing, soil samples all feel apart at 6 cm level

Table 6. Turfgrass Quality as impacted by various surfactant

Rating Date				Jul-29	Aug-3	Aug-10	Aug-18	Sep-11
Rating Type				Turfgrass Quality (0-10)***				
Trt No.	Treatment* Name	Rate per A	Appl Code					
1	Untreated			8.0 a	6.7 b	5.33 a	5.67 a	5.00 a
2	SMS-200	20 fl oz	A	8.0 a	8.0 a	6.7 a	6.67 a	6.5 a
3	SMS-EXP-1388	20 fl oz	A	8.0 a	8.0 a	5.0 a	4.93 a	4.33 a
4	DuPlex	34 fl oz	A	8.0 a	8.0 a	7.0 a	6.8 a	6.8 a
Treatment Prob(F)				1.0000	0.0029	0.4654	0.6046	0.6212

* Treatments were applied on 29 July (A)

** Means followed by same letter do not significantly differ (P=.05, Tukey's HSD).

*** Turfgrass quality on 0-10 scale where 7= acceptable threshold for quality and 10= optimal quality.

Table 7. Percent localized drought spot as impacted by surfactant

Rating Date		Jul-29	Aug-3	Aug-10	Aug-18	Sep-11		
Rating Type		Percent LDS***						
Trt	Treatment*	Rate	Appl					
No.	Name	per A	Code					
1	Untreated			0.0 a	8.3 a	33.3 a	43.3 a	47.0 a
2	SMS-200	20 fl oz	A	1.7 a	0.0 b	7.27 a	9.3 a	16.7 a
3	SMS-EXP-1388	20 fl oz	A	1.7 a	0.0 b	21.0 a	25.7 a	35.0 a
4	DuPlex	34 fl oz	A	3.3 a	4.0 ab	5.0 a	10.3 a	14.3 a
Treatment Prob(F)				0.5720	0.0095	0.1243	0.1155	0.2880

* Treatments were applied on 29 July (A)

** Means followed by same letter do not significantly differ (P=.05, Tukey's HSD).

*** Percent localized dry spot (%LSD) was rated on a 0-100 scale where 0= none and 100= entire plot area symptomatic of dry spot.

Table 8. Turfgrass color as impacted by various surfactant treatments.

Rating Date		Jul-29	Aug-3	Aug-10	Aug-18	Sep-11		
Rating Type		Turfgrass Color (0-10)***						
Trt	Treatment*	Rate	Appl					
No.	Name	per A	Code					
1	Untreated			5.0 a	5.0 a	5.0 a	5.0 a	5.0 a
2	SMS-200	20 fl oz	AB	5.0 a	5.0 a	5.0 a	5.0 a	5.0 a
3	SMS-EXP-1388	20 fl oz	AB	5.0 a	5.0 a	5.0 a	5.0 a	5.0 a
4	DuPlex	34 fl oz	AB	5.0 a	5.0 a	5.0 a	5.0 a	5.0 a
Treatment Prob(F)				1.000	1.000	1.000	1.000	1.000

* Treatments were applied on 29 July (A)

** Means followed by same letter do not significantly differ (P=.05, Tukey's HSD).

*** Turfgrass color on 0=10 scale where 7= color of untreated turf and 10= optimal color.

Table 9. NDVI as impacted by various surfactant treatments, 2010.

Rating Date		Aug-3	Aug-10	Aug-17	Aug-25	Sep-1	Sep-11		
Rating Type		NDVI***							
Trt	Treatment*	Rate	Appl						
No.	Name	per A	Code						
1	Untreated			0.6655 a	0.6933 a	0.6539 a	0.6311 a	0.5254 a	0.5864 a
2	SMS-200	20 fl oz	A	0.6693a	0.6806 a	0.6601 a	0.6437 a	0.6049 a	0.6281 a
3	SMS-EXP-1388	20 fl oz	A	0.6485 a	0.7056 a	0.6627 a	0.6182 a	0.5815 a	0.6163 a
4	DuPlex	34 fl oz	A	0.6743 a	0.7084 a	0.6558 a	0.6307 a	0.5735 a	0.6089 a
Treatment Prob(F)				0.3437	0.5936	0.8351	0.6540	0.2489	0.5670

* Treatments were applied on 29 July (A)

** Means followed by same letter do not significantly differ (P=.05, Tukey's HSD).

*** Turfgrass color on 0=10 scale where 7= color of untreated turf and 10= optimal color.