

Effects of Wetting Agent Timing on Sand-Capped Athletic Fields

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Introduction

Athletic field playability and safety is a growing national concern, particularly at the high school sports level. Athletic field usage rates increase each year while field maintenance budgets are stagnant, if not reduced. Research is needed on improving cultural practices to maximize playability and safety of natural grass athletic fields, especially in reference to prolonging field surface integrity throughout the extended high school football season. Many athletic fields endure multiple practices and games per week. Despite weather-related conditions detrimental to field integrity, Friday night games cannot be rescheduled and practice field availability often is lacking.

The objective of this trial is to investigate the use of wetting agent products and application timings as part of a sand-capped natural grass athletic field management plan to improve rootzone water content management. Multiple types of wetting agents and two application timings/rates were tested to determine product methodology and efficacy.

Materials and Methods

Research was conducted at the Iowa State University Horticulture Research Station on a 4-in. sand-cap rootzone.

Treatments were arranged in a randomized complete block factorial design with three replications. Wetting agents tested were

Alypso Plus, Dispatch, Revolution, Sixteen90, Triplo, and Vivax. Experimental units were 3 ft x 5 ft with 2-ft alleys between replications and 1-ft alleys between experimental units. Treatments were applied using a CO₂-pressurized spray system with TeeJet 8004VS nozzles at two gallons water/1,000 ft². Treatments were watered in after application with 0.75-1.0 in. irrigation water. Height of cut was 1.750 in. three days/week with a rotary mower, clippings returned. Turf type was an athletic field mix of Kentucky bluegrass (*Poa pratensis*) and perennial ryegrass (*Lolium perenne*), grown on a 4-in. sand-capped rootzone. Supplemental irrigation was applied as necessary to prevent drought-induced stress or turf loss. One pound of nitrogen/1,000 ft² was applied/growing month. Maintenance standards were developed to best mimic low- to mid-budget athletic field operations with automatic irrigation.

Wetting agent treatments were applied at 14-day or 28-day intervals, beginning June 26, at half-labeled-rate and full-labeled-rate, respectively. Each wetting agent product also had an untreated control. Simulated traffic treatments began August 2, 2017, using a modified Baldree Traffic Simulator. Simulated traffic was applied 5 days/week at one practice/game per day for 5 weeks.

Weekly digital images were collected with a light box and camera system to track turfgrass performance by percent green cover, determined by digital image analysis (DIA) software. Weekly surface hardness was collected using the 2.25 kg Clegg Impact Soil Tester. Soil moisture was measured using a time domain reflectometry probe each time surface hardness data was collected. Turfgrass shear strength also was measured. This report

covers the first year of a two-year trial. Data were analyzed using SAS software.

Results and Discussion

A significant traffic event by treatment interaction was present (data will be presented by date), as traffic increased percent cover decreased. There were no significant differences in percent turf cover between wetting agent products on any of the traffic event rating dates (Table 1). On two of three significant traffic event rating dates, Dispatch had highest surface hardness readings. Products with the lowest surface hardness readings were not consistent. There were no significant differences in soil moisture content between wetting agent products on any of the traffic event rating dates (data not shown). Application timing was significant after 15

and 20 simulated traffic events (Table 2). The control plots had higher percent cover than the 28-day interval plots; 14-day intervals were similar to both timings. Traffic treatments were stopped once percent turf cover was below fifty percent. Post-simulated traffic percent turf cover recovery was not significantly different across any treatments or traffic event rating dates (data not shown).

This is the first year of a two-year trial. Continued research is necessary to determine treatment differences.

Acknowledgements

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Table 1. Surface hardness and percent cover ratings by wetting agent product and number of simulated traffic events for timing of wetting agent applications on sand-capped rootzone, 2017.

Product	Cumulative simulated traffic event rating dates ¹				
	0	5	10	15	20
	Surface hardness ²	Surface hardness	Surface hardness	Surface hardness	Surface hardness
Alypso Plus	64.9ab	71.1ab	71.7	86.9ab	77.5
Dispatch	65.0ab	74.9a	73.7	88.6a	82.7
Revolution	65.3ab	71.7ab	73.4	84.7b	78.0
Sixteen90	65.3ab	73.6ab	71.6	86.3ab	78.4
Triplo	66.1a	70.0b	72.2	85.4ab	81.0
Vivax	62.0b	73.6ab	72.2	86.0ab	78.3
LSD (0.05) ⁴	4.0	4.3	4.0	3.4	6.4
	Percent turf cover ⁵	Percent turf cover	Percent turf cover	Percent turf cover	Percent turf cover
Alypso Plus	92.4	85.6	72.7	63.2	48.1
Dispatch	92.0	85.7	73.2	63.5	48.5
Revolution	91.1	82.8	69.3	60.1	44.7
Sixteen90	90.7	83.5	72.7	62.7	46.7
Triplo	90.8	83.5	69.7	60.8	46.7
Vivax	91.0	82.8	68.6	58.4	47.0
LSD (0.05)	1.8	5.8	6.7	6.3	5.9

¹Simulated athletic field traffic was applied using a modified Baldree Traffic Simulator.

²Surface hardness was collected using the average of three random drops of a 2.25 kg Clegg Impact Soil Tester. Soil moisture was collected at the same time with a TDR Probe (data not presented).

³Treatments followed by different letters are significantly different.

⁴Means within a column were separated using Fishers LSD.

⁵Percent turf cover collected via digital image analysis.

Table 2. Surface hardness and percent cover ratings by wetting agent timing and number of simulated traffic events for timing of wetting agent applications on sand capped rootzone, 2017.

Timing	Cumulative simulated traffic event rating dates ¹				
	0	5	10	15	20
	Surface hardness ²	Surface hardness	Surface hardness	Surface hardness	Surface hardness
Control	63.9	72.1	73.4	85.8	79.2
14 days	64.7	71.6	70.9	86.2	80.5
28 days	65.7	73.8	73.1	87.0	78.3
LSD (0.05) ³	2.8	3.0	2.8	4.5	4.6
	Percent turf cover ⁴	Percent turf cover	Percent turf cover	Percent turf cover	Percent turf cover
Control	91.9	85.2	72.3	64.1a	49.6a ⁵
14 days	91.3	83.7	71.4	60.7ab	47.4ab
28 days	90.8	83.0	68.8	59.5b	44.2b
LSD (0.05)	2.6	4.1	4.7	4.5	4.2

¹Simulated athletic field traffic was applied using a modified Baldree Traffic Simulator.

²Surface hardness was collected using the average of three random drops of a 2.25 kg Clegg Impact Soil Tester. Soil moisture was collected at the same time (data not presented).

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