

# Effects of Wetting Agent Use to Reduce Turf Damage on Native Soil Athletic Fields

## RFR-A1730

Ben Pease, research associate  
Adam Thoms, assistant professor  
Nick Christians, university professor  
Department of Horticulture

### 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. Many municipal and high school athletic fields endure multiple practices and games per week, despite weather-related conditions detrimental to field integrity. For example, Friday night high school games cannot be rescheduled due to a past or pending rain event. Research is needed to improve current cultural practices and to maximize playability and safety of natural grass athletic fields, especially in reference to prolonging field surface integrity throughout the high school football season.

The objective of this trial is to investigate the use of wetting agent products and application timings as part of a native soil natural grass athletic field management plan in preparation for a game event coinciding with a large rain event. Six products and three timings will be investigated to improve rootzone water content management.

### Materials and Methods

Research was conducted at the Iowa State University Horticulture Research Station on a native soil 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. Treatments were applied using a CO<sub>2</sub>-pressurized spray system with TeeJet 8004VS nozzles at two gallons water/1,000 ft<sup>2</sup>. Treatments were watered in after application with 0.5 in. irrigation water and then additional irrigation (1.0 in.) was applied the evening prior to traffic to simulate a large rain event. 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 native soil rootzone. One pound of nitrogen/1,000 ft<sup>2</sup> was applied/growing month. Maintenance standards were developed to best simulate low- to mid-budget athletic field operations with automatic irrigation.

Wetting agent treatments were applied at seven, five, or one day(s) prior to simulated traffic treatments that began August 2, 2017. Full-labeled-rates were used. Each wetting agent product also had an untreated control. Simulated traffic treatments were applied using a modified Baldree Traffic Simulator. Simulated traffic was applied 5 days/week at one practice/game per day for 4 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**

Surface hardness-by-product values were significantly different at 0, 5, 10, and 15 simulated traffic events (Table 1). Alypso Plus had the lowest surface hardness readings at 0, 5, and 15 simulated traffic events. Highest hardness values were Revolution on two of four traffic event rating dates; other traffic event rating dates were not consistent. Percent turf cover differences by product were significant at 15 simulated traffic events; highest percentage cover was Alypso Plus. Lowest percent cover were Dispatch, Revolution, and Sixteen90.

Surface hardness-by-timing of application was not significant at any amount of simulated traffic events (Table 2). Percent turf cover-by-timing of application was significant at 15 simulated traffic events. Application five days prior to traffic event had the highest percent turf cover; one day prior had the lowest percent turf cover.

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

### **Acknowledgements**

The authors thank Aquatrols and Precision Labs for donation of test product.

**Table 1. Surface hardness and percent cover ratings by wetting agent product and number of simulated traffic events on Kentucky bluegrass over a native soil rootzone, 2017.**

Product	Cumulative simulated traffic events rating dates <sup>1</sup>			
	0	5	10	15
	Surface hardness <sup>2</sup>	Surface hardness	Surface hardness	Surface hardness
Alypso Plus	46.1b <sup>3</sup>	85.0b	100.0abc	105.9b
Dispatch	47.1ab	89.3ab	103.8a	109.6ab
Revolution	48.9ab	91.9a	100.4abc	112.6a
Sixteen90	50.2a	88.4ab	96.8bc	110.3ab
Triplo	47.1ab	88.3ab	101.9ab	104.8b
Vivax	46.4ab	88.2ab	95.5c	106.8ab
LSD (0.05) <sup>4</sup>	3.8	5.2	5.5	6.6
	Percent turf cover <sup>5</sup>	Percent turf cover	Percent turf cover	Percent turf cover
Alypso Plus	91.4	91.7	76.5	83.1a
Dispatch	92.4	91.8	77.5	76.9b
Revolution	92.3	89.8	77.0	77.8b
Sixteen90	92.1	90.3	78.5	77.4b
Triplo	92.3	92.8	77.2	81.1ab
Vivax	91.9	91.2	76.4	79.7ab
LSD (0.05)	1.6	4.0	8.8	4.3

<sup>1</sup>Simulated athletic field traffic was applied using a modified Baldree Traffic Simulator.

<sup>2</sup>Surface 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).

<sup>3</sup>Treatments followed by different letters are significantly different.

<sup>4</sup>Means within a column were separated using Fishers LSD.

<sup>5</sup>Percent 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 Kentucky bluegrass over a native soil rootzone, 2017.**

Timing	Cumulative simulated traffic event rating dates <sup>1</sup>			
	0	5	10	15
	Surface hardness <sup>2</sup>	Surface hardness	Surface hardness	Surface hardness
Control	46.2 <sup>3</sup>	89.3	97.5	106.6
1 day	47.5	89.3	100.2	109.7
5 day	48.3	89.3	99.4	106.6
7 day	48.5	89.1	101.7	108.7
LSD (0.05) <sup>4</sup>	3.1	6.1	5.6	9.5
	Percent turf cover <sup>5</sup>	Percent turf cover	Percent turf cover	Percent turf cover
Control	91.9	90.9	76.0	79.6ab
1 day	92.3	91.3	76.1	75.8b
5 day	92.1	91.4	77.5	81.4a
7 day	92	91.5	79.1	80.5ab
LSD (0.05)	2.0	5.6	11.1	5.5

<sup>1</sup>Simulated athletic field traffic was applied using a modified Baldree Traffic Simulator.

<sup>2</sup>Surface 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).

<sup>3</sup>Treatments followed by different letters are significantly different.

<sup>4</sup>Means within a column were separated using Fishers LSD.

<sup>5</sup>Percent turf cover collected via digital image analysis.