

## Effects of Wetting Agent Timing on Native Soil Athletic Fields

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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. 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 is often lacking.

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 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 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 and 1-ft alleys between experimental units. 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 0.75-1.0 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 native soil rootzone. Supplemental irrigation was applied as necessary to prevent drought-induced stress or turf loss. One pound of nitrogen/1,000 ft<sup>2</sup> 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 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**

A significant traffic event by treatment interaction was detected (data are presented by traffic event rating dates), as traffic increased turfgrass cover decreased for three of the four traffic event rating dates. Surface hardness-by-cumulative simulated traffic event rating dates were significant at 10 traffic events (Table 1). Products Sixteen90 and Vivax had lower surface hardness readings than Revolution; all other treatments were similar. Percent turf cover differences were significant on five traffic event rating dates, with Revolution having lower percent cover than Sixteen90 and Triplo.

Surface hardness-by-wetting agent timing was not significant on any traffic event rating dates (Table 2). Percent turf cover-by-wetting agent timing differences were significant on two traffic event rating dates with the control having higher percent control than 28-day interval applications. The 14-day interval applications were similar to the control.

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 for timing of wetting agent applications on 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	61.7	84.9	73.4ab	104.9
Dispatch	55.9	85.9	77.1ab	106.5
Revolution	60.0	84.1	80.9b	106.1
Sixteen90	58.0	86.3	72.7a	103.7
Triplo	66.7	82.8	73.7ab	97.8
Vivax	66.5	87.6	72.9a	96.5
LSD (0.05) <sup>3</sup>	14.4	6.1	7.6	10.1
	Percent turf cover <sup>4</sup>	Percent turf cover	Percent turf cover	Percent turf cover
Alypso Plus	87.2ab	69.4a	52a	63.2
Dispatch	87.2ab	70.0a	46.7ab	63.5
Revolution	84.8b	62.5b	43.0b	60.1
Sixteen90	88.4a	68.7a	49.8ab	62.7
Triplo	88.5a	70.9a	51.3a	60.8
Vivax	87.0ab	66.0ab	48.4ab	58.4
LSD (0.05)	2.8	6.1	8.2	14.2

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

<sup>4</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 timing of wetting agent applications on 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	58.1	84.1	74.2	101.7
14 days	60.9	84.4	75.4	102.3
28 days	65.4	87.3	75.8	103.8
LSD (0.05) <sup>3</sup>	10.2	7.0	9.1	9.9
	Percent turf cover <sup>4</sup>	Percent turf cover	Percent turf cover	Percent turf cover
Control	87.5	70.9a	51.0	64.1a
14 days	86.9	68.6a	47.5	60.7ab
28 days	87.1	64.3b	47.0	59.5b
LSD (0.05)	2.0	4.3	5.8	4.5

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<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).

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