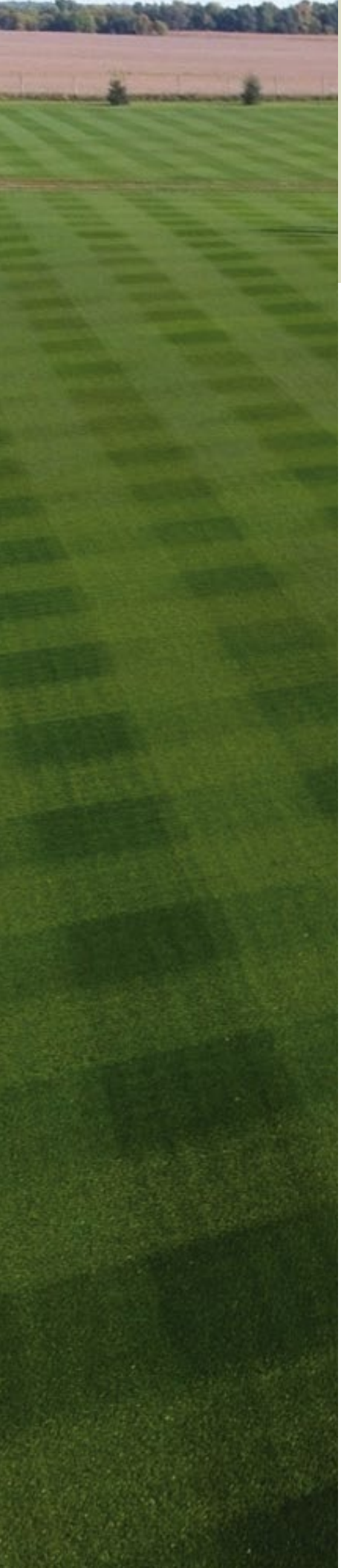

Effects of Various Wetting Agents on Athletic Turfgrass Under Simulated Traffic

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Wetting agents are amphiphilic compounds that typically are applied to turfgrass to increase soil water retention. These typically are used on golf course greens, fairways, and on athletic turfgrass to decrease drought stress. While being widely used by turfgrass managers, minimal research exists on the effect wetting agents have on turfgrass quality and athletic playability under traffic. The objective of this study is to evaluate different market available wetting agents on athletic turfgrass under simulated traffic to evaluate the effects on soil physical properties, turfgrass quality, and athletic safety.

Materials and Methods

Field research was conducted during the fall of 2021 at the Horticulture Research Station. Plots were 5 ft. x 12 ft. in size and were established in a pre-existing Kentucky bluegrass [KBG; *Poa pratensis L.*] turfgrass stand on a native soil. Treatments were arranged in a complete randomized block design. Wetting agents were applied to each plot area at the recommended rate one week prior to the start of traffic and again 28 days after the first application (Table 1). Fertility was applied monthly 0.5 lb. of N 1,000 ft.^{2} each month (August-October) using a 28-0-3 granular fertilizer. Irrigation was only applied after wetting agent and fertilizer applications. The experiment area was maintained at a 2 in. height of cut using a rotary mower (mowed twice per week) with clippings returned. A modified Baldree Athletic Field Traffic Simulator was used to apply simulated traffic events (STE) 20 times (3 times per week) between September 5 and October 19. After every fifth traffic event, athletic field performance and safety was evaluated within each plot area. Field performance was quantified by measuring percent green cover through the use of digital image analysis (DIA). Athletic safety was quantified through surface hardness (Clegg Impact Surface Tester), rotational resistance (shear), and volumetric soil moisture (TDR). Soil porosity and bulk density were evaluated before and after simulated traffic occurred. After the 20 STEs, turfgrass visual quality was examined in each plot area on a scale of 1-9, with 9 being the best and 1 being the worst. Data were subjected to ANOVA and means were separated with Fisher's LSD at P=0.05 level of significance.

Results and Discussion

No differences were found between treatments for volumetric water content and rotational resistance. While percent green cover decreased with traffic events, there was no significant difference between treatments. Surface hardness did increase between simulated traffic events, but there was no treatment difference. Final plot ratings also were not significantly different after 20 simulated traffic events (Table 2). Overall, it can be concluded the tested market available wetting agents do not negatively impact athletic turfgrass quality or athletic playability. While the greatest benefit of limiting drought stress was not tested in this experiment, it should help improve the quality of turfgrass since it is not drought stressed.

Acknowledgements

The authors would like to thank Ethan DenBeste and Thomas Folie for their help with data collection and plot maintenance.

Table 1. List of wetting agent treatments, standard rates, and application rates used in this experiment to test under simulated athletic field traffic.

Treatment	Rate	Applied Rate (ml)
Control	N/A	N/A
Penefiltrate	26 oz./A	3.5
Turf Wet Select	6 oz./1000	35.5
Tri Wet Select	6 oz./1000	35.5
Vivax	5 oz./1000	29.6
Duplex	20 oz./acre	2.7
Revolution	6 oz./1000	35.5

Table 2. Percent green cover, surface hardness (Clegg Impact Soil Tester), soil moisture (TDR), rotational resistance (shear), and visual plot quality rating for various wetting agent treatments after 20 simulated traffic events.

Treatment	Green cover %	CIST (GMAX)	TDR %	Shear (Nm)	Final plot rating 1-9
Control	58.3	73.8	24.7	20.0	5.8
Penefiltrate	51.2	74.6	27.8	21.8	5.5
Turf Wet Select	52.9	77.3	20.7	21.3	5.5
Tri Wet Select	56.5	78.9	23.8	20.3	5.8
Vivax	53.8	78.3	23.9	21.8	5.0
Duplex	47.1	82.2	22.8	18.0	5.3
Revolution	54.8	79.8	22.7	19.3	5.5
$LSD_{(0.05)}$[a]	NS[b]	NS	NS	NS	NS

[a]Treatment mean comparisons were separated using Fisher's protected least significant difference (LSD).
[b]NS, nonsignificant at the 0.05 probability level.