Bermudagrass Cultivar Trial Subjected to Simulated Athletic Field Traffic

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Introduction

Interest in bermudagrass use as an athletic field playing surface has grown recently with the release of more cold tolerant cultivars of bermudagrass. Bermudagrass is more traffic tolerant than Kentucky bluegrass in many situations. It also performs better during the summer months due to the C4 photosynthesis pathways compared with the C3 pathways of Kentucky bluegrass. For these reasons, many Iowa athletic field managers are curious about the performance of bermudagrass as an athletic field playing surface in Iowa.

The objectives of this study were to compare the performance and traffic tolerance of cold tolerant bermudagrass cultivars with a simulated Iowa high school football traffic season. This is the first year of a two-year study.

Materials and Methods

Research was conducted at the Iowa State University Horticulture Research Station on a native soil rootzone. Sprigs of Latitude 36 and Northbridge hybrid bermudagrass were planted July 2016 and allowed to establish until fall 2017. Plots were covered with growth covers for the winter.

The experimental design was a randomized block design with five replications. The study will be repeated over two years. Simulated athletic traffic was applied using a modified Baldree Traffic Simulator following the Iowa High School Athletic Association football schedule. Plots received five simulated traffic events/week, once traffic simulation was initiated. Every plot had 100 percent green turfgrass cover at study initiation. Plots received 1 lb nitrogen/1,000 ft^2 in May, June, July, and August.

A digital image was captured before traffic initiation and after every five simulated traffic events using a light box and digital camera. Digital image analysis (DIA) was performed to track percent green cover on the plots.

Surface hardness was collected with three random drops on every plot with a 2.25 kg Clegg Impact Soil Tester. Soil moisture data (data not presented) were collected at the same time. Surface stability was tested with a shear vane tester (data not presented). Soil moisture, shear vane, and surface hardness data were collected after every five simulated traffic events.

Results and Discussion

A significant date-by-treatment interaction was present, so data are presented by rating date. No differences between cultivars were present for surface hardness (Table 1). Surface hardness was never above 100 GMAX, the NFL limit for GMAX. Percent green cover (Table 2) was reduced with increased traffic, and Latitude 36 (40%) had a higher percent green cover than NorthBridge (32%) bermudagrass after 20 simulated athletic events. Another year is needed to draw stronger conclusions.

Acknowledgements

Table 1. Surface hardness for bermudagrass cultivars subjected to simulated athletic field traffic, 2017.

	Simulated traffic event[1]				
	0	5	10	15	20
Cultivar	Surface hardness[2]	Surface hardness	Surface hardness	Surface hardness	Surface hardness
Latitude 36	42	79	65	49	54
NorthBridge	43	77	70	48	55
LSD (0.05)[3]	NS[4]	NS	NS	NS	NS

[1]Simulated athletic field traffic was applied using a modified Baldree Traffic Simulator.
[2]Surface hardness was collected using the average of 3 random drops of a 2.25 kg
Clegg Impact Soil Tester. Soil moisture were collected at the same time (data not presented).
[3]Means were separated using Fishers LSD.
[4]NS = not significant at the alpha level = 0.05.

Table 2. Percent cover for bermudagrass cultivars subjected to simulated athletic field traffic, 2017.

	Simulated traffic event[1]				
	0	5	10	15	20
Cultivar	Percent green cover[2]	Percent green cover	Percent green cover	Percent green cover	Percent green cover
Latitude 36	98	75	59	46	40
NorthBridge	98	79	59	40	32
LSD (0.05)[3]	NS[4]	4.5	NS	NS	4.8

[1]Simulated athletic field traffic was applied using a modified Baldree Traffic Simulator.
[2]Percent green cover was calculated from digital image analysis.
[3]Means were separated using Fishers LSD.
[4]NS = not significant at the alpha level = 0.05.