

Tall Fescue Mowing Height Performance Under Simulated Traffic

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Introduction

Tall fescue (*Festuca arundinacea*) requires fewer inputs than other cool-season grasses such as Kentucky bluegrass (*Poa pratensis*). With improved turf-type tall fescue cultivars, more facilities are choosing tall fescue over Kentucky bluegrass due to better traffic and drought tolerance. The objective of this study was to determine what height of cut offers the best aesthetic quality as well as safety measured by surface hardness, soil moisture, and shear vane rotational resistance for Iowa. This is the second year of a two-year study.

Materials and Methods

Research was conducted at the Iowa State University Horticulture Research Station, Ames, Iowa, on the Sports Turf Research Area over native soil rootzones. The experimental design was a randomized block with three replications. Three mowing height treatments included were 3.81 cm, 5.08 cm, and 7.62 cm height of cut (HOC). Treatments were applied three times/week throughout the growing season. Simulated athletic field traffic was applied with a modified Baldree traffic simulator (BTS) and initiated at the same time as the Iowa high school football season. The research area received three simulated traffic events/week for nine weeks. Digital images were collected after every traffic event to track turfgrass performance with percent green cover. Percent green cover was determined using Digital Image Analysis. Surface

hardness, soil moisture, and shear vane rotational resistance also were collected after every five traffic events. Surface hardness was collected using the 2.25 kg Clegg Impact Soil Tester. Soil moisture was collected with the FieldScout TDR with 3-in. probes, and Shear Vane was collected using TurfTec Shear Tester.

Results and Discussion

In year two of this study, surface hardness only varied between treatments on one rating date (Table 1). After 10 simulated traffic events, the 3.81 cm HOC (56 GMAX) had a higher surface hardness than the 7.62 cm HOC (62 GMAX). No differences were reported for any other rating date. After 25 simulated traffic events, surface hardness values for all HOC treatments were above 100 GMAX (the upper limit for surface hardness in the NFL). No significant differences were reported for rotational resistance or volumetric water content in year two (data not presented).

Percent green cover differed between mowing height treatments for five of six rating dates (Table 2). After five simulated traffic events, the 3.81 cm HOC (64.8%) had less green turf cover than the other two HOC treatments (71.4% and 74.9%). These HOC cover differences also were present after 10 and 15 simulated traffic events (Table 2). The 7.62 cm HOC (25.3%) had a greater percent green cover than the 3.81 cm HOC (19.7%) after 20 simulated traffic events. Finally, after 25 simulated traffic events, the 3.81 cm HOC (12.8%) had a lower percent cover than the 5.08 cm HOC (17.9%).

In year one of the study, 3.81 cm HOC provided the greatest percent cover on four rating dates and ended the season at 40.7

percent cover and had 93.4 percent cover remaining after 10 traffic events. In year two, however, excessive rain caused many traffic events to be applied in conditions that naturally cause a field to degrade prematurely. The impact of the excessive moisture was evident on all HOC treatments. Last year after 25 events, all treatments were above 31

percent cover. This year after just 15 simulated events, many of the treatments were close to that level of cover. This indicates a lower mowing height will experience a larger decrease in cover under higher moisture conditions as compared with lower moisture conditions.

Table 1. Effect of various tall fescue mowing heights on surface hardness (GMAX) using a 2.25 kg Clegg Impact Soil Tester under simulated athletic traffic, 2018.

Treatment ²	Number of simulated traffic events ¹				
	5	10	15	20	25
3.81 cm	32 ³	56	82	78	114
5.08 cm	33	61	82	78	112
7.62 cm	33	62	80	76	114
LSD (0.05) ⁴	2.3	5.4	3.6	3.9	5.5

¹Simulated athletic events applied using a modified Baldree traffic simulator starting August 7, 2018.

²Mowing height treatments were applied using a Toro rotary push mower applied three times/week during the growing season.

³Surface hardness values collected using a 2.25 kg Clegg Impact Soil Tester.

⁴Means were separated using Fisher's LSD and significant at the 0.05 level of significance.

Table 2. Effect of various mowing heights for tall fescue on percent green cover under simulated athletic traffic, 2018.

Mowing height ²	0 ³	Number of simulated traffic events ¹				
		5	10	15	20	25
3.81 cm	95.5	64.8	41.1	25	19.7	12.8
5.08 cm	96.5	71.4	54.5	33.5	21.8	17.9
7.62 cm	96.3	74.9	56.3	32.8	25.3	14.5
LSD (0.05) ⁴	0.9	4.6	5.6	4.7	3.5	3.6

¹Simulated athletic events applied using a modified Baldree traffic simulator starting August 7, 2018.

²Mowing height treatments were applied using a Toro rotary push mower applied three times/week during the growing season.

³Percent green cover as determined with digital image analysis.

⁴Means were separated using Fisher's LSD and significant at the 0.05 level of significance.