

Sports Field Recovery from Unplanned Suspension of Maintenance Activities

RFR-A2038

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Introduction

Athletic field managers may face periods of unplanned suspension of maintenance activities. This can be due to a variety of reasons including pandemics seen recently with COVID-19. When turf managers return, turf height of cut (HOC) can be much higher than desired. Reducing HOC can be stressful for the plant, and information is lacking for the most efficient and effective way to reduce turf HOC. The objective of this research is to determine the best management plan to reduce HOC and provide a surface that is uniform, aesthetically pleasing, and safe for athletes. This is the first year of a two-year study.

Materials and Methods

This trial was conducted at the Iowa State University Horticulture Research Station, Ames, Iowa, on Moonlight Kentucky bluegrass (*Poa pratensis* L.) established on native soil. Maintenance activities were withheld from the start of spring through the end of May. Experimental variables include HOC reduction method, rate of nitrogen fertilizer, and the use of trinexapac-ethyl, which is a widely used plant growth regulator (Table 1). Experimental design is a randomized split-block design with four replications. All treatments are subjected to simulated fall athletic traffic with a modified Baldree Traffic Simulator (BTS), half of each plot not trafficked. Simulated traffic began mid-August to align with the start of the high school football season. Three games of traffic

are applied per week for 25 games. Athletic field performance and safety was tested every five games. Performance is quantified by measurements of percent green cover with digital image analysis, while safety is quantified with surface hardness measurements with a 2.25kg Clegg Impact Surface Tester (CIST), and soil shear strength with a TurfTec Shear Tester (a device used by the National Football League (NFL) for testing surface stability; data not shown). Previous research has reported a negative correlation between surface hardness and soil moisture, so volumetric water content of the soil was tested with every CIST reading using a FieldScout TDR. Soil physical properties including bulk density and total porosity were evaluated to investigate any changes in the soil after 25 simulated traffic events (data not shown).

Results and Discussion

Percent green cover is a great indicator of turfgrass performance. There was a significant treatment by traffic by date interaction. Plots receiving traffic had lower percent green cover than those that did not receive traffic. Under simulated traffic, treatment two had the greatest percent green cover on every rating date, while treatment nine had the least percent green cover (Table 2). Surface hardness values were higher on plots with simulated athletic field traffic than those that did not receive the simulated athletic field traffic (Table 3). No treatment on any rating date resulted in a surface hardness reading above 100 GMAX, the maximum allowable measurement by NFL protocols. Another year of research is needed to make determinations on what maintenance regime will best recover athletic fields from an unplanned suspension of maintenance.

Acknowledgements

Appreciation to the Iowa State Athletics department for help in funding, and to Tim Dalsgaard for assistance with data collection.

Table 1. Kentucky bluegrass athletic field height of cut reduction, nitrogen rate, and plant growth regulator regimes tested for turfgrass tolerance to fall simulated athletic field traffic in Ames, Iowa.

Treatment no.	Height of cut reduction rate	Nitrogen (N) fertilizer/1,000 ft ² per growing month	PGR ^a
1	1/3 tissue removed/mowing	0.75 lb N	No
2	1/3 tissue removed/mowing	0.75 lb N	Yes
3	Mow to final HOC in one mowing	0.75 lb N	No
4	Mow to final HOC in one mowing	1.5 lb N	No
5	Remove half height, then 1/3 cut	0.75 lb N	Yes
6	Remove half height, then 1/3 cut	0.75 lb N	No
7	Remove half height, then 1/3 cut	1.5 lb N	Yes
8	Remove half height, then 1/3 cut	1.5 lb N	No
9	1/3 tissue removed/mowing	1.5 lb N	No
10	1/3 tissue removed/mowing	1.5 lb N	Yes

^aPGR = plant growth regulator was Trinexapac-ethyl applied.

Table 2. Percent green cover of Kentucky bluegrass under simulated athletic field traffic treated with various maintenance regimes in Ames, Iowa.

Mowing treatments	10 simulated traffic events		15 simulated traffic events		20 simulated traffic events		25 simulated traffic events	
	Untrafficked	Trafficked	Untrafficked	Trafficked	Untrafficked	Trafficked	Untrafficked	Trafficked
1	97	96	97	68	90	51	80	37
2	98	96	99	76	95	63	88	46
3	98	93	98	68	96	57	91	41
4	98	92	99	63	96	46	91	33
5	98	95	98	51	91	35	78	24
6	99	97	98	70	93	56	83	41
7	99	89	98	62	96	48	87	36
8	98	95	98	66	92	56	88	42
9	99	79	99	44	94	33	86	20
10	99	95	98	72	94	57	88	40
LSD (0.05)	2	13	3	6	26	29	12	23

Table 3. Surface harness collected with a 2.25 Kg Clegg Impact Surface Tester for Kentucky bluegrass treated with various maintenance regimes under simulated traffic events in Ames, Iowa.

Treatments number	10 simulated traffic events		15 simulated traffic events		20 simulated traffic events		25 simulated traffic events	
	Untrafficked	Trafficked	Untrafficked	Trafficked	Untrafficked	Trafficked	Untrafficked	Trafficked
1	36	42	37	43	37	45	42	62
2	36	47	39	43	37	48	42	64
3	40	52	41	45	40	53	45	72
4	40	49	40	44	39	51	45	64
5	37	54	37	43	40	52	46	67
6	38	42	39	47	38	50	42	57
7	41	53	41	44	41	58	46	67
8	42	46	39	42	41	48	47	61
9	40	46	37	39	36	49	39	66
10	41	48	40	43	39	46	44	59
LSD (0.05)	8	11	5	4	7	11	7	10