Optimum Seeding Rates That Maximize Turf Cover When Established Under Traffic

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In a turfgrass system under continuous traffic stress, overseeding is a common practice to improve turfgrass cover in worn out areas. Seeding at the upper range for a recommended species is often suggested. Many sports turf managers seed at rates that often exceed the recommended range by a factor of two and sometimes three. The upper range for seeding rates is not clearly understood when traffic is applied during the seed establishment period.

Objective
The purpose of this research was to determine the optimum rates and schedules to overseed in a system under continuous traffic stress.

Methods
Two independent trials, one on Kentucky bluegrass KB (*Poa pratensis* L.) and the other on perennial ryegrass PR (*Lolium perenne* L.) were established on a Nicollet (fine-loamy, mixed, mesic Aquic Hapludoll) soil with 4.0% organic matter at the Horticulture Research Farm in Ames, Iowa USA, on 3 Sep 2003 and were repeated on 1 Sep 2004.

Each trial was composed of 7 seeding rates and 2 seeding regimes. Seeding was done all at once during the first date (concentrated regime) or scattered in 7 sowings (disperse regime). Disperse seeding was performed exactly one week apart over a 7 week period to match final seeding rates of concentrated seeding. The experimental design was a randomized complete block with 4 replications. Treatments consisted of seeding rates of 1, 2, 3, 4, 5, 6 and 7 lb/1000 ft^2 for KB and 5, 10, 15, 20, 25, 30 and 35 lb/1000 ft^2 for PR. Traffic stress was initiated immediately after the first seeding in all plots. Traffic was applied weekly with a GA-SCW traffic simulator (Carrow et al., 2001) during a 10-week period. Four passes were made with the simulator every Friday for a total of 40 passes.

Turf cover was evaluated monthly, but only final data of autumn and spring of the first year are reported at this time. The data were analyzed using PROC ANOVA of the SAS software, Version 8 of the SAS System for Windows (SAS Institute, 1999). Means were separated ($\alpha = 0.05$) by Fischer's protected LSD.

Results
The impact of seeding rates on turf cover was more noticeable for perennial ryegrass than Kentucky bluegrass. The early concentrated seeding produced more turf cover for Kentucky bluegrass and perennial ryegrass than the dispersed seeding when observed at the end of the football season on 14 Nov 2003. Under concentrated seeding, Kentucky bluegrass turf cover increased as the seeding rates increased up to 5 lbs/1000 sq.ft. For perennial ryegrass, turf cover increased as seeding rates increased up to 25 lbs/1000 sq.ft. By the following summer, there was little difference between Kentucky bluegrass seeding rates. For perennial ryegrass, observations on 29 June still indicated that the 25 lbs/1000 sq.ft. seeding rate seems justified to maximize turf cover. More research needs to be conducted to determine the seeding rate impact on actual biomass/thatch/mat production.

Table 1. Percent cover of Kentucky Bluegrass plots at the end of the Fall 2003 and Spring of 2004.

Seeding rate (#)	Dispersed seeding	
	14-Nov	29-Jun
	%	
1	0.5	66.3
2	0.5	70.0
3	1.0	67.5
4	1.3	71.3
5	0.5	70.0
6	1.0	70.0
7	0.8	71.3
	Concentrated seeding	
	14-Nov	**29-Jun**
	%	
1	1.0	60.0
2	1.8	66.3
3	2.3	68.8
4	1.8	68.8
5	3.3	63.8
6	3.0	75.0
7	3.0	75.0
Lsd $_{0.05}$	0.7	3.6

Table 2. Percent cover of Perennial Ryegrass plots at the end of the Fall 2003 and Spring of 2004.

Seeding rate #	Dispersed seeding	
	14-Nov	29-Jun
	%	
5	22.5	71.3
10	32.5	77.5
15	40.0	81.3
20	43.8	83.8
25	63.5	91.3
30	63.8	93.8
35	65.0	90.0
	Concentrated seeding	
	14-Nov	**29-Jun**
	%	
5	33.8	75.0
10	43.8	78.8
15	55.0	85.0
20	65.0	86.3
25	76.0	90.0
30	83.8	92.5
35	83.8	93.8
Lsd $_{0.05}$	10.0	5.2

Literature cited

Carrow, R.N., R.R. Duncan, J.E. Worley and R.C. Shearman. 2001 Turfgrass traffic (soil compaction plus wear) simulator response of Paspalum vaginatum and Cynodon spp. P. *In* K .Carey (ed.) Int. Turf Soc. Research J. 9:253-258.

SAS Institute. 1999. The SAS system for windows, Version 8. SAS Institute Inc., Cary, NC.