Optimum Seeding Rates for Establishing Kentucky Bluegrass, Perennial Ryegrass, and Tall Fescue in the Presence of Simulated Traffic

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Objective
The purpose of this study was to determine the optimal seeding rates for turfgrass species under various simulated traffic levels.

Methods
This study was conducted at Iowa State University's football practice facility in Ames, Iowa during fall 2005. Three turfgrass species, Kentucky bluegrass (*Poa pratensis* 'Unique') (KB), tall fescue (*Festuca arundinacea* 'Millennium II') (TF) and perennial ryegrass (*Lolium perenne* 'Catalina') (PR) were evaluated. For each species, eight seeding rates were arranged in 7 ft by 2 ft whole plots. Seeding rates for KB were: 1, 3, 6, 19, 12, 15, 30, 45 lbs/1000sq.ft., TF: 5, 10, 15, 30, 45, 60, 90, 120 lbs/1000sq.ft., PR: 5. 10, 15, 30, 45, 60, 120, 200 lbs/1000sq.ft. Six levels of traffic, 2, 4, 8, 12, 16, 20 passes per week, were arranged in strip plots and were applied to each seeding rate with a GA-SWC traffic simulator (Carrow et al. 2001). The experimental design for each turf species was randomized complete block with a strip plot arrangement and 3 replications. Individual plots were 7 ft by 2 ft.

All seeding occurred on 2 September 2005. Seeds were broadcast into a stand of mature Kentucky bluegrass which had been killed with Roundup prior to seeding. Immediately following seeding, eight passes of simulated traffic were applied to all seeding treatments to uniformly "cleat-in" the seed. Each subsequent week, for 10 weeks, concentrated traffic was applied at the various traffic levels. The last application of traffic occurred on 11 November 2005.

Percent turfgrass cover was recorded each week immediately before applying traffic treatments. 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 (α=0.05) by Fischer's protected LSD

Results
A range of traffic levels were used to simulate different traffic intensity. Traffic levels of 2, 8, and 16 passes wk^{-1} represented traffic intensities of low, medium, and high, respectively. Turfgrass cover was reduced for all species as traffic level increased.

Kentucky bluegrass – Under low traffic conditions increasing the seeding rate of KB from 1 lb/1000sqft to 9 lb/1000 sq.ft. resulted in increased turf cover. At medium and high levels of traffic seeding rate had no influence on turf cover and turf cover was less than 10%.

Tall fescue and Perennial ryegrass – Under low and medium traffic levels increasing seeding rate from 5 to 30 lbs/1000sqft resulted in increased turf cover. High traffic levels resulted in substantially less turf cover and there were few differences among seeding rates.

It appears that extremely high seeding rates are beneficial under certain levels of traffic.

Table 1. Percent turfgrass cover for KB, TF, and PR for year 1 (2004) and year 2 (2005) at the end of the traffic period of each year.

22 October 2004		Traffic Level‡		
		2 (low)	8 (med)	16 (high)
Species	Seeding Rate†	% Turfgrass Cover		
KB	1	20.3	10.7	0
	3	28.3	10.7	0
	9	39.3	16	1.7
TF	5	30	26.3	15
	10	26	26.7	15
	30	60	40.7	23
PR	5	35	33.3	13.3
	10	26.7	23.3	15
	30	46.7	45	20
	LSD$_{0.05}$	21.74	16.44	7.87

11 November 2005		Traffic Level‡		
		2 (low)	8 (med)	16 (high)
Species	Seeding Rate†	% Turfgrass Cover		
KB	1	5	.33	0
	3	11.7	1.3	0
	9	25	2.3	0
TF	5	23.3	3.7	.67
	10	25	5	1
	30	75	8.3	1
PR	5	30	6.7	1.7
	10	45	13.3	2.3
	30	83.3	16.7	3.7
	LSD$_{0.05}$	12.6	4.13	2.04

† Pounds of seed per 1000 sq. ft.

‡ Passes of traffic simulator every Friday

Literature cited

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

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