

# Interaction of Cool Season Grass Species During Over Seeding and Traffic Simulation

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Athletic fields in northern climates are often established with Kentucky bluegrass (*Poa pratensis* L.) (KB). Intense traffic and over seeding with perennial ryegrass (*Lolium perenne* L.) (PR) can change the species mixture of the turfgrass sward. Seedling vigor and species traffic tolerance will influence the eventual components of the turfgrass mixture. actual mixture of species that remain on the field. Kentucky bluegrass, PR and supina bluegrass (*Poa supina* Schrader) (SB) are potential cool season grass species that can be used to over seed trafficked areas of Kentucky bluegrass football fields.

## Objective

To determine turfgrass cover and specie dominance when an established stand of KB is over seeded with KB, PR, and SB in the presence of traffic.

## Methods

This study was conducted at the Iowa State University Horticulture Research Farm in Ames Iowa on a 2-yr old stand of Unique KB growing on a sand based root zone. Two similar but independent trials were established on a mature stand of KB that was routinely over seeded with KB, PR, and SB in the presence of simulated traffic. Autumn and spring traffic were simulated in separate study areas initiated on 6 September 2002 and 2 May 2003, respectively. Species were seeded and traffic was applied in the same plots over the three year study. The experimental design was randomized complete block design with 3 replications and a split-plot arrangement. Whole plots consisted of 2 levels of traffic periodicity and split-plots were 8 over seeding treatments. Over seeding treatments were 1, 2, 3 lb/1000 ft<sup>2</sup> of KB, 1 lb/1000 ft<sup>2</sup> of SB seed and 2, 4, 6 lb/1000 ft<sup>2</sup> of PR plus a non seeded control. Traffic periodicity consisted of concentrated and dispersed. Concentrated traffic was applied all on one day a week and dispersed traffic (data not shown) was spread out by applying traffic every other day during the week. Traffic simulation was applied with a GA-SWC traffic simulator (Carrow et al. 2001). Four passes per wk were made with the traffic simulator for 10 consecutive wks. The cleat pattern resulted in 56 cleats per sq.ft. per pass and one pass with the traffic simulator equaled one game at the NCAA level of competition according to Cockerham (1989). Two days prior to seeding and traffic treatments the entire study area was given 100 passes with the traffic simulator to reduce turf cover by 50%. Evaluation of percent turf cover was used to evaluate specie performance during the traffic and recovery periods. Tiller density was determined at the end of each trial (data not shown). 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

Species - Perennial ryegrass and supina bluegrass over seeding had the greatest turf cover at the end of the 3-year study compared to Kentucky bluegrass. Turf cover increased with each subsequent year for Perennial ryegrass and supina bluegrass, but not for Kentucky bluegrass.

Fall Seeding – Kentucky bluegrass over seeding did not increase turf cover compared to the non-seeded control. Perennial ryegrass over seeding increased turf cover compared to the non-seeded control in year 2 at the 6 lb/1000 sq.ft. rate and at all seeding rates in year 3. Supina bluegrass increased turf cover compared to the non-seeded control only in the last year of the trial.

Spring Seeding – Kentucky bluegrass over seeding did not improve turf cover compared to the non-seeded control. Perennial ryegrass and supina bluegrass increased turf cover by the 3<sup>rd</sup> year of the study compared to the non-seeded control.

Individual tillers of each species have been counted and the dynamic between plant species within a turfgrass sward is being evaluated

**Table 1.** Percent cover of Kentucky bluegrass, perennial ryegrass and supina bluegrass observed in the autumn traffic area after traffic simulation and recovery periods

Species	Seeding Rate	Date						
		12 Aug 02	14 Nov 02	29 Jun 03	18 Nov 03	22 Jun 04	29 Nov 04	15 Jun 05
		Year 1		Year 2		Year 3		
lb/1000 ft <sup>2</sup>			†	‡	†	‡	†	‡
		Cover (%)						
Control	0	100	49	87	49	96	35	100
KB	1	100	48	88	52	96	33	98
KB	2	100	43	87	55	96	35	98
KB	3	100	48	92	55	96	40	98
PR	2	100	49	89	55	95	62	100
PR	4	100	56	91	61	95	68	100
PR	6	100	64	93	79	96	72	100
SB	1	100	40	91	46	98	68	100
LSD 0.05		N.S.	18	N.S.	16	N.S.	19	N.S.

† Rating done after traffic period  
‡ Rating done after recovery period

**Table 2.** Percent cover of Kentucky bluegrass, perennial ryegrass and supina bluegrass observed in the spring traffic area after traffic simulation and recovery periods.

Species	Seeding Rate	Date					
		14 Nov 02	29 Jun 03	18 Nov 03	22 Jun 04	29 Nov 04	15 Jun 05
		Year 1		Year 2		Year 3	
lb/1000 ft <sup>2</sup>			†	‡	†	‡	†
		Cover (%)					
Control	0	100	44	100	60	100	55
KB	1	100	65	100	64	100	50
KB	2	100	56	100	63	100	53
KB	3	100	63	98	64	100	50
PR	2	100	53	100	70	100	73
PR	4	100	56	100	78	100	80
PR	6	100	69	100	72	100	85
SB	1	100	49	100	70	100	73
LSD 0.05		N.S.	13	N.S.	N.S.	N.S.	18

† Rating done after traffic period  
‡ Rating done after recovery period

**Literature cited**

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