

Traffic Tolerance of Cool Season Seedling Turf Under Simulated Football Traffic-Multiple Seeding Trial

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Turfgrass species used for sport fields are often selected based on wear tolerance of a mature species. In reality, worn areas of the playing field are seeded during the playing season resulting in traffic stress on seedling turf. Traffic tolerance of seedling turf and the eventual recovery of the entire grass system have not been studied

Objective

To determine the ability of various grass species to establish during simultaneous multiple seeding and simulated traffic.

Methods

This study was conducted at the Horticulture Research Farm in Ames, Iowa. Two separate trials were conducted. An autumn trial was seeded September 2002 to simulate fall football and a spring trial was seeded April 2003 to simulate spring soccer. The species evaluated in this study were Kentucky bluegrass (*Poa pratensis*), perennial ryegrass (*Lolium perenne*), tall fescue (*Festuca arundinacea*), fine fescue (*Festuca sp.*), creeping bentgrass (*Agrostis palustris*), colonial bentgrass (*Agrostis capillaris*) Col, velvet bentgrass (*Agrostis canina*) and *Poa supina*. Each trial followed a Split plot design with 4 replications, 8 treatments (species) and 2 levels of traffic simulation.

The seeding rate (lb/1000sq.ft) and the number of times that each plot was seeded appear in Table 1. Each trial was seeded weekly for six consecutive weeks after the initial seeding and traffic date. Traffic and seeding began on September 18 for the fall football trial and on April 18 for the spring soccer trial.

Table 1. Species and seeding rates used in the establishment trials.

Turf species	Fall Seeded		Spring Seeded	
	Rate lb/1000ft ²	Seeding times	Rate lb/1000ft ²	Seeding times
Kentucky bluegrass	2	6	2	6
Perennial ryegrass	10	6	10	6
Tall fescue	10	6	10	6
Fine fescue	10	6	10	6
<i>Poa supina</i>	2	6	2	6
Creeping bentgrass	2	6	2	6
Velvet bentgrass	2	6	2	6
Colonial bentgrass	2	6	2	6

Traffic stress was applied with a GA-SWC traffic simulator (Carrow et al. 2001). Each species received two levels of traffic (split plot) as indicated in Table 2. Traffic started on September 18 and ended on November 8 for the fall trial. Spring traffic started on April 18 and ended on June 27.

Table 2. Traffic schedule for fall 2002 and spring 2003.

Number of passes/week	Number of passes per day				
	Monday	Tuesday	Wednesday	Thursday	Friday
6 Concentrated	0	0	0	0	6
6 Dispersed	2	0	2	0	2

Evaluation of percent turf cover was used to evaluate a species performance during the traffic and recovery periods. Biomass production was determined at the end of each trial (data not shown).

Results

Fall Traffic – Perennial ryegrass had the best turf cover during the fall trafficked establishment period. After the spring recovery period, all of the species had at least 80% turf cover. Some of the fall trafficked seedlings recovered contributed to the spring recovery; however, it was also apparent that some of the fall applied seed germinated in the spring and significantly contributed to the high turf cover ratings at the end of the spring recovery period (Table 3). Since the end of the spring recovery period coincides with the start of the next football season it is clear that perennial ryegrass, tall fescue and fine fescue would have produced the best playing conditions at the start of the fall football season.

Table 3. Percent turf cover of species seeded multiple times in fall of 2002 under 2 levels of simulated traffic.

Turf species	Traffic 2002			Recovery 2003	
	Sep-27	Oct-23	Nov-8	May-29	Jul-3
	Turf cover (%)				
Kentucky bluegrass	0.0	0.0	2.0	50	86
Perennial ryegrass	36.3	45.6	38.8	90	99
Tall fescue	2.0	5.0	2.0	86	98
Fine fescue	3.3	5.0	1.3	83	98
<i>Poa supina</i>	0.0	0.0	0.0	58	87
Creeping bentgrass	0.0	1.0	0.5	47	83
Velvet bentgrass	0.0	2.0	0.0	35	82
Colonial bentgrass	0.0	0.0	0.0	34	81
LSD_{0.05}	2.61	1.85	0.98	15.25	5.84
Traffic intensity					
Concentrated	n.d.	7	6	64	90
Dispersed	n.d.	7	5	57	88
LSD_{0.05}	NS	NS	NS	NS	NS

Traffic intensity did not seem to affect species response; however, recovery seemed to be slightly better in plots with concentrated traffic (Table 3). This indicates that when scheduling events it would be better to have several events on one field in a short period of time followed by a lengthy recovery period (concentrated traffic) as compared with spreading out the same number of events over an extended period with limited recovery time (dispersed traffic).

For the trial seeded in spring, results were a little different. Only tall fescue and perennial ryegrass were significantly better than the other species by the end of the study. All other species showed around 75% of covered ground. Traffic intensity did not seem to have any influence on species and their performance.

Table 4. Percent turf cover of species seeded multiple times in spring of 2003 under 2 levels of simulated traffic.

Turf species	Traffic period Turf cover (%)	
	May-29	Jul-3
Kentucky bluegrass	11	74
Perennial ryegrass	53	91
Tall fescue	27	89
Fine fescue	34	79
<i>Poa supina</i>	9	72
Creeping bentgrass	44	74
Velvet bentgrass	19	78
Colonial bentgrass	24	76
LSD_{0.05}	7.65	5.03
Traffic intensity		
Concentrated	28	79
Dispersed	28	79
LSD_{0.05}	NS	NS

Summary

The following turfgrass species were ranked from best to worst according to establishment during traffic stress:

Perennial ryegrass > Tall fescue > Fine fescue = Kentucky bluegrass = Supina bluegrass > Bentgrass

The study will be repeated in 2004.

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. 253-258. In K. Carey (ed.) Int. Turf Soc. Research J. vol. 9.