Performance of Established Cool Season Grasses Under Simulated Football Traffic

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Objective

To evaluate the traffic tolerance of cool season grasses when mature species are provided with seed in the presence of traffic.

Methods

This study was conducted at the Horticulture Research Farm in Ames, Iowa. The trial was seeded in September 2000 to address questions on a mature and fully established system. 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*), and *Poa supina* . The experimental design was a Randomized Complete Block with a split plot arrangement. There were 4 replications, 6 species (whole plots) and 2 levels of traffic simulation (split-plots). Each grass species had 100% turf cover before traffic treatments were initiated in April 2001. During 2001, the trial was overseeded a total of 5 times to guarantee the maximum possible recovery from seed (Table 1).

Table 1. Treatment description, species, seeding rates and seeding times used for establishment of cool season grasses.

	Summer-Fall 2001		
Turf species	**Seed rate lb/1000ft^2**	**Times seeded**	**Total seed lb/1000ft^2**
Kentucky bluegrass	2	5	10
Perennial ryegrass	10	5	50
Tall fescue	10	5	50
Fine fescue	10	5	50
Poa supina	2	5	10
Creeping bentgrass	2	5	10

Traffic stress was applied with a GA-SWC traffic simulator (Carrow et al. 2001). Each species received two levels of traffic. The traffic simulator was operated with 2 or 4 passes of the simulator each Monday, Wednesday and Friday for a total of 6 and 12 passes per week. Traffic simulation in 2001 started on April 20 and ended on May 15. Plots were reseeded after this traffic period 2 times; traffic simulation was then reinitiated 2 weeks later. Traffic simulation stopped on June 15 and the plots were reseeded again 1 time. The final traffic period was from August 20 to October 26, 2001. The total number of passes in 2001 was 90 and 180. In 2002, traffic simulation started August 19 and finished October 28 for a total of 10 weeks (60 and 120 passes). No additional seed was applied in 2002. No traffic or seeding was done in 2003. Percent turf cover was evaluated several times during the traffic and recovery periods. A final evaluation was performed on 29 May 2003.

This trial received 1 lb of Nitrogen on August, September and October of 2001, April, May, August and September of 2002 and April and May of 2003 for a total of 9 lbs during the entire 25 months of traffic and recovery (20 April 2001 to 29 May 2003).

Results

Perennial ryegrass and Kentucky bluegrass consistently provided the most turf cover over the duration of the study (Table 2.). Supina bluegrass provided the most turf cover in 2001 during the initial year of traffic treatment but as traffic continued in 2001 and 2002 Supina bluegrass had less turf cover than Kentucky bluegrass, perennial ryegrass and tall fescue. Supina bluegrass prefers cool moist conditions and high nitrogen. Summer heat and lower than desirable nitrogen may have contributed to decline in traffic tolerance in 2002 and 2003. Tall Fescue is also a good option for sites that are under constant traffic. The opposite was observed for fine fescue. Constant seeding helped fine fescue to maintain a moderate cover, but turf cover rapidly declined when seeding stopped.

Creeping bentgrass wears down quickly but also recovers quickly by spreading stolons. Ultimately creeping bentgrass had intermediate to poor traffic tolerance (Table2).

Table 2. Percent turf cover at the end of each traffic and recovery period for 6 species of turfgrass under 2 levels of traffic.

	Traffic			Recovery
	Jun 28-2001	Oct 26-2001	Oct 28-2002	May 29-2003
Turf species		Turf cover (%)		
Kentucky bluegrass	89	88	92	90
Perennial ryegrass	79	89	89	92
Tall fescue	82	88	81	80
Fine fescue	78	83	32	31
Poa supina	94	85	66	72
Creeping bentgrass	76	78	50	62
LSD $_{0.05}$	15.36	3.03	10.97	11.81
Traffic intensity				
2 X	n.d.	89	79	81
4 X	n.d.	81	57	63
LSD $_{0.05}$		1.75	6.33	6.83

As expected, more traffic resulted in less turf cover. Traffic intensity had a significant effect. Doubling the amount of traffic, 2 passes Vs. 4 passes reduced turf cover approximately from 80 to 65%.

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.