Traffic Tolerance of Cool-Season Grass Species and Cultivars when Established During Spring and Fall in the Presence of Traffic

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Objectives

To evaluate the relative establishment rate of Kentucky bluegrass (*Poa pratensis*) varieties, perennial ryegrass (*Lolium perenne*), annual ryegrass (*Lolium multiflorum*) and tall fescue (*Festuca arundinacea*) when established under traffic simulation.

Materials and Methods

Two independent trials were conducted at the Horticulture Research Farm in Ames Iowa during spring and fall of 2006. The experimental design was a Randomized Complete Block with a split plot arrangement. There were 3 replications, 10 cultivars or blends (whole plots) (Table 1) and 2 levels of traffic simulation (split-plots). Traffic stress was applied with a GA-SCW (Georgia Soil Compaction Wear) simulator with cleated rollers and a differential slip action (Carrow et al. 2001). Each species received two levels of traffic (traffic and no traffic) every Friday for 10 weeks after initial seeding. Each small plot was 2 ft x 10 ft. Seed was broadcast onto bare ground and cleated-in with ten passes of the GA-SCW traffic simulator prior to initiation of traffic treatment.
The spring trial was seeded on 3 May 2006, traffic simulation started on 12 May 2006 and continued weekly until 14 July 2006. Four passes of the simulator were applied every Friday for total of 40 passes during the spring traffic period. A separate autumn trial was seeded on 13 September 2006. Traffic simulation started on 22 Sept and ended 17 November 2006. Four passes of the simulator were applied every Friday. A total of 32 passes were applied in the autumn trial.

The percent plot area showing turfgrass species was visually estimated. 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

Percent turf cover served as a measure of traffic tolerance when simulated traffic was applied immediately after seeding. Grasses with more turf cover at the end of the traffic period were considered more traffic tolerant (Table 2). There were no differences between cultivars within a grass species.

Spring/Summer Traffic Tolerance - During spring/summer establishment the traffic tolerance of grass species ranked in order from best to worst were: annual rye = perennial rye > tall fescue > Kentucky bluegrass. It is also important to evaluate recovery following traffic. By fall the ranking had changed to perennial rye > tall fescue > annual rye > Kentucky bluegrass. The decline in turf performance of annual ryegrass was likely caused by summer stress and the natural decline process for annual ryegrass. There was a substantial decline in annual rye turf cover after 15 July.

Autumn Traffic Tolerance – During autumn establishment the traffic tolerance of grass species ranked in order from best to worst were: annual rye ≥ perennial rye > tall fescue > Kentucky bluegrass. Annual ryegrass seems to be slightly more traffic tolerant than perennial ryegrass in the autumn compared to the spring.

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.

Table 1. Turfgrass species, cultivars and sowing rates used in the study.

TRT #	Cultivar	Type	Characteristic	Sowing Rate (lbs/1000 sq. ft)
1	Bariris	Kentucky bluegrass	Fast establishment, wear tolerance	7
2	Barimpala	Kentucky bluegrass	Fast germination & establishment, wear tolerance	7
3	Barrister	Kentucky bluegrass	Slow establishment but high turf quality	7
4	Bariris	Kentucky bluegrass	Blend	2.3
	Barimpala	Kentucky bluegrass	Blend	2.3
	Barrister	Kentucky bluegrass	Blend	2.3
5	Barlennium	Perennial Ryegrass	Wear tolerant perennial ryegrass	10
	Bargold	Perennial Ryegrass	Wear tolerant perennial ryegrass	10
	Barlinda	Perennial Ryegrass	Wear tolerant perennial ryegrass	10
6	Barrington	Tall fescue	Wear tolerant tall fescue	30
7	Panterra	Annual Ryegrass	Turf-type	50
8	Unique	Kentucky bluegrass	Control	7
9	Catalina	Perennial Ryegrass	Control	30
10	Millenium	Tall Fescue	Control	30

Table 2. Percent turfgrass cover for non-trafficked and trafficked grass seeded in the spring and autumn of 2006

Cultivar	Type	Spring Seeded				Fall seeded		
		21-May	14-Jun	12-Jul	15-Oct	30-Sep	22-Oct	21-Nov
					No traffic applied			
					Turf cover (%)			
Bariris	KB	0.0	13.3	5.7	10.0	8.3	14.7	26.7
Barimpala	KB	0.0	7.7	5.7	4.7	6.7	18.7	28.3
Barrister	KB	0.0	13.3	11.3	14.0	6.7	13.3	25.0
Bariris, Barimpala & Barrister	KB	0.0	13.3	6.7	5.7	8.3	13.3	26.7
Barlenium, Bargold & Barlinda	PR	25.0	91.7	86.7	76.7	53.3	80.0	88.3
Barrigton	TF	0.0	65.0	30.0	66.7	26.7	60.0	70.0
Panterra	AR	36.7	98.3	86.7	43.3	66.7	91.7	100.0
Unique	KB	0.0	13.3	7.0	6.0	10.0	17.3	25.0
Catalina	PR	23.3	91.7	90.0	80.0	43.3	73.3	90.0
Millenium	TF	4.7	75.0	73.3	73.3	31.7	63.3	75.0
LSD		4.7	14.9	12.4	18.2	10.1	6.6	6.8

Cultivar	Type	Spring Seeded				Fall seeded		
		21-May	14-Jun	12-Jul	15-Oct	30-Sep	22-Oct	21-Nov
		Traffic Period			Recovery Period	Traffic Period		
					Traffic applied			
					Turf cover (%)			
Bariris	KB	0.0	4.3	3.0	6.0	2.7	4.3	8.3
Barimpala	KB	0.0	2.7	3.0	3.3	2.0	4.3	10.0
Barrister	KB	0.0	6.0	3.7	7.7	2.0	3.7	5.0
Bariris, Barimpala & Barrister	KB	0.0	4.3	2.0	4.3	2.0	4.7	8.3
Barlenium, Bargold & Barlinda	PR	7.7	56.7	60.0	56.7	23.3	60.0	51.7
Barrigton	TF	0.0	16.7	10.0	43.3	11.7	40.0	25.0
Panterra	AR	11.7	80.0	66.7	30.0	25.0	73.3	73.3
Unique	KB	0.0	5.0	3.3	4.0	2.0	5.7	6.7
Catalina	PR	6.7	58.3	68.3	60.0	20.0	53.3	66.7
Millenium	TF	2.0	30.0	36.7	55.0	15.0	43.3	30.0
LSD		2.7	18.6	15.0	14.2	7.8	7.4	13.8