

GREENS ESTABLISHMENT AND POA ANNUA INFESTATION

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Introduction

Annual bluegrass (*Poa annua*) has been debated as “friend or foe” of the golf world for years. The decision to control or manage annual bluegrass on golf course putting greens in temperate regions lies solely on the green’s keeper. This decision becomes more complex as new preemergence and postemergence pesticides are released and tested and as new varieties of each species are engineered and tested. On putting greens, annual bluegrass gains a competitive edge over creeping bentgrass (*Agrostis palustris* Huds.) with traffic because annual bluegrass can better tolerate soil compaction and new plant germination is encouraged as soil is disturbed. Putting green traffic cannot be avoided, but its even dispersal is achieved with pin movement. This competitive edge could, theoretically, be lessened if a newer, denser, creeping bentgrass cultivar used in a given putting green.

It would be beneficial to explore the interaction of annual bluegrass and newer creeping bentgrass cultivars with more plants per unit area relative to older, less dense, cultivars that are still widely used for putting greens, such as Penncross. If denser creeping bentgrass cultivars significantly increase a putting green’s ability to decrease the amount of annual bluegrass invasion, then other control tactics, chemical and cultural, could become more valuable. Newer creeping bentgrass cultivars could increase a green’s keeper’s ability to maintain a putting green mono-stand of creeping bentgrass.

Materials and Methods

This research was initiated in 2003 at the Hancock Turfgrass Research Center in East Lansing, MI. The site was maintained for many years as an annual bluegrass fairway ensuring a large seed-bank. This turf was stripped and on 30 May, 2003 and an 18.3 x 18.3 m putting green was established in its place. The study was set up as a two-factor split-plot design with four replications. The main factor consisted of four creeping bentgrass cultivars: Penncross, Providence, Penn G-2, and Bengal. The second factor consisted of two levels of traffic: traffic and no traffic.

Traffic was usually applied by two people weighing between 150 and 200 lbs, each wearing Foot-Joy® DryJoy® golf shoes equipped with Softspikes® Black Widow® spikes. The applied traffic was quantified by an earlier observational study that systematically counted foot steps per unit area in relation to daily pin rotation, which was then extrapolated to 200 rounds of golf per day. Traffic began on 24 September 2003, when the turf had sufficiently grown in, and ended 2 weeks later. In 2004, traffic began on 21 April and ended in early October.

Annual bluegrass infiltration was measured on a near-monthly basis by counting the centers of annual bluegrass in each plot. This data was analyzed with proc mixed in SAS.

Results and Discussion

Table 1 shows that traffic had no effect on the amount of annual bluegrass invasion until it accumulated for several months. As more traffic accumulated, the existing creeping bentgrass became increasingly injured and the soil became increasingly displaced. It makes sense that the trafficked plots had more annual bluegrass than the untrafficked plots (Table 3) at the later dates when the creeping bentgrass was at its relatively most trafficked point and the soil had been continually disturbed.

The creeping bentgrass cultivar, on the other hand, affected the amount of annual bluegrass invasion initially, but, later, became a non-factor. There may be a threshold level of annual bluegrass infiltration that, when reached, makes the creeping bentgrass cultivar chosen for use a non-factor. The annual bluegrass infiltration level may fluctuate, as the climate favors one species or the other, above and below this threshold throughout the year, which would also fluctuate the significance of the cultivars in terms of annual bluegrass infiltration.

Table 1: Analysis of Variance – Annual Bluegrass Center Count

Source of Variation	df	2003	2004					
		23 Sep	7 April	22 April	13 May	6 July	4 Aug	28 Sep
Blocks	3							
Cultivar	3	*	*	*	*	NS	NS	*
Traffic	1	NS	NS	NS	NS	*	*	*
Cult*Traffic	3	NS	NS	NS	NS	NS	NS	NS
Error	12							

* and NS indicate significance at the $\alpha = 0.05$ probability level and not significant, respectively.

Table 2 is a comparison of annual bluegrass counts between each of the creeping bentgrass cultivars on seven different dates. It is important to note that Penncross, the oldest cultivar, not known for its density, is in the “least annual bluegrass” category on every date, except for 7 April. Bengal was in the “least annual bluegrass” category on every date, except for 28 September. Providence was in the “most annual bluegrass” category on every date.

Table 2: Cultivar Comparison – Annual Bluegrass Center Count

Cultivar	2003	2004					
	23 Sep	7 April	22 April	13 May	6 July	4 Aug	28 Sep
Penncross	62.6a	68.3c	93.6a	96.6a	140.9a	114.8a	286.5a
Providence	92.9b	56.6b	122.9b	143.8b	144.0a	134.2a	362.3ab
Penn G-2	63.1a	55.6b	109.4ab	142.5b	117.4a	120.8a	270.4a
Bengal	73.8a	43.5a	80.5a	84.4a	109.0a	177.3a	475.6b
SED	17.4	8.7	22.1	35.6	35.4	70	119.1

SED : Standard error of difference.

† Means in each column containing the same letter are not significantly different.

Table 3: Traffic Comparison – Annual Bluegrass Center Count

Traffic Treatment	2003	2004					
	23 Sep	7 April	22 April	13 May	6 July	5 Aug	28 Sep
Traffic	74.3a	60.4a	110.3a	119.9a	159.8a	174.4a	452.3a
No Traffic	71.9a	51.6a	92.9a	113.8a	95.9b	99.1b	245.1b
SED	16.5	12	18.6	17	20.7	28.7	80.2

SED : Standard error of difference.

† Means in each column containing the same letter are not significantly different.

As newer creeping bentgrass cultivars are continuously developed, this data can prepare golf course superintendents to make better choices and better spend their money. We can begin to see the benefits of denser putting greens and be ready to supplement these newer cultivars with other chemical and cultural annual bluegrass control methods when the environment begins to favor it. Or, as years continue to pass and we fail to find a silver bullet for this great foe, we can surrender and welcome it as a friend.