Field Performance of Roundup Ready Creeping Bentgrass

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One of the major challenges for creeping bentgrass management is the control of annual bluegrass and other grassy weeds, most of which cannot be readily controlled by conventional weed control programs due to their similar response to herbicides. Herbicide-tolerant crops, particularly crop species tolerant to the non-selective herbicide Roundup® (active ingredient glyphosate), gained acceptance in some countries and were grown extensively during the past decade in the United States. The development of Roundup® tolerant creeping bentgrass would offer great promise for the golf industry because it would provide simplified and a more effective control of aggressive annual and perennial weeds including annual bluegrass, roughstalk bluegrass, bermudagrass and many other grassy and broadleaf weeds in golf course turf. Roundup Ready creeping bentgrass is currently being considered by USDA for possible deregulation. Once deregulated, Roundup Ready creeping bentgrass could soon become available. The objective of this study is to compare field performance of the Roundup Ready creeping bentgrass with a number of conventional creeping bentgrass cultivars including Crenshaw, L 93, Penncross, Penneagle, Penn A4 and Providence under fairway conditions.

Materials and Methods

The trial was established Fall 2002 at Iowa State University Turf Research Facility. The experiment is a completely randomized design with three replications. All entries were maintained under the same fairway conditions with a mowing height of 0.5 cm, 4 lbs of N/1000 ft^2/growing season. Fungicides are used as needed in a preventive program. Herbicide treatments are listed in Table 1.

Results

Ground coverage

Percentage of ground cover was recorded from March through June when the Roundup Ready plots were almost completely covered (Table 2). In March, all plots have only a small percentage of ground coverage. By June, the coverage has increased greatly, particularly the Roundup Ready genotypes with a Roundup application in early May. However, the percentage of ground cover for Roundup Ready creeping bentgrass was within the ranges observed for conventional creeping bentgrass.

Turfgrass quality

From July to October, turfgrass quality for each plot was recorded (Table 3). The quality of Roundup Ready creeping bentgrass was within the ranges that were observed for conventional creeping bentgrass.

Table 1. A list of treatments for both conventional cultivars and Roundup Ready Creeping bentgrass

Treatment	Cultivar	Roundup 21 DAE*	Roundup late fall	Weed control as needed
1	L 93	No	No, CWC**	CWC
2	Penncross	No	No, CWC	CWC
3	Penneagle	No	No, CWC	CWC
4	Providence	No	No, CWC	CWC
5	Penn A-4	No	No, CWC	CWC
6	Crenshaw	No	No, CWC	CWC
7	Roundup Ready A	Yes, 48 oz/A	No, CWC	CWC
8	Roundup Ready A	Yes, 48 oz/A	Yes, 48 oz/A	Roundup,48 oz/A
9	Roundup Ready B	Yes, 48 oz/A	Yes, 48 oz/A	Roundup,48 oz/A
10	Roundup Ready A + B	Yes, 48 oz/A	Yes, 48 oz/A	Roundup,48 oz/A

*DAE: Days after emergence; **CWC: Conventional weed control;

Table 2. Ground coverage of both conventional cultivars and Roundup Ready Creeping bentgrass

	--------Percent Ground Coverage------			
Entry	**March**	**April**	**May**	**June**
L 93	23.3	40.0	45.0	63.3
Penncross	33.3	51.7	61.7	83.3
Penneagle	28.3	35.0	41.7	73.3
Providence	26.7	35.0	50.0	65.0
Penn A-4	18.3	35.0	46.7	66.7
Crenshaw	11.7	21.7	45.0	61.7
Roundup Ready A	8.3	23.3	48.3	78.3
Roundup Ready A	11.7	25.0	53.3	83.3
Roundup Ready B	10.0	33.3	53.3	81.7
Roundup Ready A + B	15.0	30.0	60.0	91.7
LSD 0.05	15.4	15.8	17.7	25.7

Table 3. Turfgrass quality for conventional cultivars and Roundup Ready Creeping bentgrass

	----------Turf Quality----------				
Entry	**July**	**August**	**September**	**October**	**Average**
L 93	6.7	6.3	6.0	6.0	6.3
Penncross	6.3	6.7	6.0	6.3	6.3
Penneagle	6.3	6.7	5.7	6.0	6.2
Providence	6.0	6.3	5.0	6.0	5.8
Penn A-4	6.7	6.3	5.0	6.0	6.0
Crenshaw	5.7	7.3	5.7	6.0	6.2
Roundup Ready A	6.7	6.7	6.7	6.0	6.5
Roundup Ready A	6.7	6.7	6.0	6.0	6.3
Roundup Ready B	6.7	7.0	6.7	6.3	6.7
Roundup Ready A + B	6.3	6.3	6.0	6.3	6.3
LSD 0.05	0.9	1.2	0.8	0.8	0.7