Field Evaluation of Roundup Ready® Kentucky Bluegrass

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Introduction:

Demand for genetically modified crops has seen an increase in popularity. Along with the benefits modified crops provide, there are some concerns of their ecological impact. The objectives of the Roundup Ready® bluegrass study were to establish conventional cultivars of Kentucky bluegrass, tissue culture regenerated genotypes from conventional cultivars and transformed lines (glyphosate resistant) of Kentucky bluegrass to evaluate their vegetative and reproductive traits. Assessing these traits will allow us to determine if the transformed plants pose an ecological threat. All lines will be studied in a mown, competitive and non-mown, non-competitive setting. Once established, comparisons of plant characteristics will be made for both the mown and non-mown studies. Seed characteristics and production will also be evaluated for the non-mown study.

Materials and Methods:

The study included 18 different genotypes obtained from The Scotts Company in the form of plugs. There were 11 conventional cultivars, three tissue culture regenerated lines, and four transformed lines (Table 1). The studies were conducted as randomized complete blocks with four replications each. With 18 treatments and four replications, this was a total of 72 treatment plots per study. Creeping red fescue was seeded over the plot of the mown, competitive study to simulate competition between the two species. All plots were established in the Fall of 2003. Maintenance was provided for the mown and non-mown studies. The competitive study was kept at a mowing height between 2 ½ and 3 inches. Incidences of grassy or broadleaf weeds were controlled with appropriate herbicides. In addition, incidence of disease was controlled with the proper fungicides. Data were collected the following two growing seasons and study termination occurred in the Fall of 2005.

Monthly data collection began at the beginning of each growing season and ended once the growing season was over. Vigor and competitiveness of the cultivars were evaluated at the end of each month during the growing season by measuring traits related to vegetative encroachment and colony area. Colony quality components were evaluated by rating each colony's color retention, disease and insect susceptibility, and unusual or unexpected growth or color. The aforementioned data were collected on both the non-mown and mown studies.

Additional data were collected for the non-mown, non-competitive study. The vegetative and botanical characteristics examined included panicle length, flag leaf length, width, and sheath length, spikelets per panicle, ligule type, and internode length. Flowering characteristics measured included date of inflorescence emergence, inflorescence density, date of anthesis initiation and cessation, and maturity date. Lastly, seed production data were taken. The seed production data included clean seed weight, weight of 100 seed, and total number of seedheads per plant colony.

Results and Discussion:

Data is currently being analyzed and will be made available by Fall 2006. Selective data of vegetative encroachment, the mean length of the four longest rhizomes in each of a four-quadrant grid (one measurement per quadrant), for the 2005 non-mown study have been analyzed (Table 1.) Seed production data is currently being analyzed and will be made available upon completion. All data will be used for comparison purposes to evaluate the three categories of genotypes.

Table 1. Vegetative encroachment data of longest rhizome means (cm) for non-mown study during 2005 growing season.

Genotype/Cultivar	May	June	July	August	September
Tx01-2862±	24.8	25.8	27.8	31.5	31.8
Midnight†	35.5	36.0	41.3	44.5	46.0
Touchdown†	40.5	49.5	53.8	57.5	59.5
Texas Bluegrass†	34.3	36.8	37.0	38.8	40.3
02080S HB-130‡	44.0	48.0	51.0	56.8	58.5
Abbey†	37.5	43.3	44.0	44.5	44.8
Bx01-5609±	7.3	8.5	9.3	7.5	8.5
Tx01-2875±	32.0	38.0	39.3	42.3	43.8
Tx01-2900±	37.8	39.5	43.3	46.5	47.8
021128c HB-130‡	47.3	54.0	54.3	60.8	62.5
Limousine†	28.0	32.0	35.0	37.3	31.0
Unique†	36.8	40.0	45.3	45.0	44.0
Ascot†	39.8	43.5	46.5	48.0	48.8
HB-129†	46.5	55.5	58.0	62.8	62.8
South Dakota†	44.5	53.3	55.5	61.8	63.0
010607c Unique‡	35.5	38.8	41.0	41.5	41.8
HB-329†	37.3	41.8	44.5	46.5	44.8
HB-130†	53.8	60.3	64.0	68.0	72.0
LSD (0.05)	11.1	12.8	12.3	13.1	15.8

†Conventional Cultivars
‡Tissue Regenerate Cultivars
±Transformed Cultivars