

Evaluation of Kentucky Bluegrass Cultivars for Necrotic Ring Spot

Steve Abler, Jeff Gregos, and Geunhwa Jung
Department of Plant Pathology

INTRODUCTION

Kentucky bluegrass is an important Wisconsin turfgrass species that is used extensively for home lawns, golf courses, and athletic fields. There are numerous cultivars of Kentucky bluegrass available to consumers. These cultivars are often blended and sold as seed or sod. There are several major diseases that infect and colonize Kentucky bluegrass in Wisconsin. The most frequently seen of these is necrotic ring spot incited by the root-infecting fungus *Ophiosphaerella korrae* which accounted for 34 (33%) of the homeowner samples submitted to the Turfgrass Diagnostic Lab in 2003. Because of the importance of Kentucky bluegrass in the state and the prevalence of necrotic ring spot, this study was initiated to evaluate commercial cultivars and experimental lines of Kentucky bluegrass for their susceptibility to necrotic ring spot and other important turfgrass diseases in Wisconsin.

MATERIALS AND METHODS

One hundred Kentucky bluegrass cultivars and breeding lines were planted at the O.J. Noer Turfgrass Research and Education Facility, Verona, WI in the summer of 2000. The cultivars were established in 5 x 5 ft (25 ft²) plots in a randomized complete block design with three replications. Plots were fertilized at a rate of 1 lb. N/1000ft² three times yearly using Spring Valley 21-3-12. Irrigation was applied twice each week at 100% evapotranspiration and the plots were maintained at a clipping height of 1.5 inches. The plots were artificially inoculated on November 16, 2001 with a culture of *O. korrae* that was isolated in Wisconsin. The culture (#110) was obtained from Dr. Ned Tisserat of Kansas State University. Inoculum of *O. korrae* was prepared by autoclaving oat seeds in Difco[®] nutrient broth. Plugs from the *O. korrae* culture were transferred aseptically to the oat seeds, shaken daily, and incubated for one month at room temperature. Three turfgrass plugs (5 cm in diameter; 5-7 cm deep) were removed from the center of each plot, and a half-teaspoon of the inoculum was placed in each hole. The turfgrass plugs were then replaced in their corresponding holes. In June of 2003, the clipping height of the plots was lowered to ¾ inch to enhance symptom development. Visual ratings of disease severity were recorded on July 20, 2003 using a 0-5 rating scale where 0 = no symptoms and 5 = complete necrosis. The number of individual “frog-eyes” in each plot was also recorded. These two ratings as well as the disease index (the product of the severity and number of patches) value are listed in the table.

DISCUSSION

Faint symptoms of necrotic ring spot were first noticed in the fall of 2002. In contrast, symptom expression in the summer of 2003 was very distinct, presumably because of the wet spring and dry summer which are conducive for disease. There were clear differences in disease susceptibility among the cultivars of Kentucky bluegrass ranging from the most resistant ‘Odyssey’ (disease index = 0.8) to the most susceptible ‘Serene’ (disease index = 50.0). In most plots, the diseases symptoms were limited to the center, inoculated area. However, some plots

had diseased patches throughout the plots. It was assumed that the cultivars with patches outside the inoculated areas were susceptible to natural populations of *O. korrae* present in the soil or less likely, from the rapid spread of pathogen from the inoculated area. It should also be noted that the susceptibility of the cultivars used in this study correlate strongly with the necrotic ring spot rating for the 2000 NTEP Kentucky bluegrass study included in this report.

July 20, 2003 Necrotic Ring Spot Ratings for 100 Kentucky Bluegrass Cultivars

Cultivar	Severity ^a	Patch # ^b	Index ^c	Cultivar	Severity ^a	Patch # ^b	Index ^c
ODYSSEY	0.8 b	0.7 e	0.8 e	MOONLIGHT	4.0 ab	1.7 de	7.3 e
AWARD	1.3 ab	0.7 e	1.3 e	VIVA	4.3 ab	1.7 de	7.7 e
QUANTUM LEAP	1.5 ab	1.0 e	1.5 e	BARON	3.3 ab	2.3 cde	8.0 e
LIBERATOR	1.7 ab	0.7 e	1.7 e	FAIRFAX	3.3 ab	2.3 cde	8.0 e
CHALLENGER	1.8 ab	1.0 e	1.8 e	MONOPOLY	4.0 ab	2.0 de	8.0 e
VOYAGER	1.8 ab	1.0 e	1.8 e	SEBRING	3.0 ab	2.0 de	8.0 e
ABSOLUTE	2.0 ab	0.7 e	2.0 e	GNOME	3.0 ab	2.3 cde	8.3 e
BLUESTONE	2.0 ab	1.0 e	2.0 e	NORTHSTAR	5.0 a	1.7 de	8.3 e
BLUESTAR	2.0 ab	1.0 e	2.0 e	PARK	4.3 ab	2.0 de	8.3 e
NUSTAR	2.0 ab	1.0 e	2.0 e	CHICAGO II	3.7 ab	2.0 de	8.7 e
RUGBY II	1.5 ab	1.3 de	2.0 e	BA 87-102	4.0 ab	2.0 de	8.7 e
BOUTIQUE	2.3 ab	1.0 e	2.3 e	BA 74-114	4.3 ab	2.0 de	8.7 e
MIDNIGHT	2.7 ab	0.7 e	2.7 e	BUCKINGHAM	4.7 ab	2.0 de	9.0 e
KENBLUE	2.3 ab	1.0 e	3.0 e	DENIM	3.3 ab	2.3 cde	9.3 e
NUGLADE	3.0 ab	1.0 e	3.0 e	WASHINGTON	3.2 ab	2.7 cde	9.8 de
RAMBO	3.0 ab	1.0 e	3.0 e	BANFF	2.0 ab	3.0 b-e	10.0 de
ADELPHI	2.3 ab	1.3 de	3.3 e	RONDE	3.3 ab	2.7 cde	10.0 de
ARCADIA	3.3 ab	0.7 e	3.3 e	SUFFOLK	3.3 ab	2.7 cde	10.0 de
FREEDOM II	2.7 ab	1.3 de	3.3 e	BA 72-492	4.3 ab	2.3 cde	10.3 de
UNIQUE	3.3 ab	1.0 e	3.3 e	BA 77-279	4.0 ab	2.7 cde	10.3 de
SR 2000	3.7 ab	1.0 e	3.7 e	GOLDRUSH	4.7 ab	2.3 cde	10.7 de
GLADE	2.3 ab	1.0 e	4.0 e	CREST	4.0 ab	2.7 cde	11.3 cde
BA 78-258	3.0 ab	1.3 de	4.0 e	BA 72-500	4.0 ab	3.0 b-e	12.0 cde
ABBEY	2.5 ab	1.3 de	4.2 e	ALPINE	4.3 ab	2.7 cde	12.7 cde
CANNON	3.3 ab	1.3 de	4.3 e	LIVINGSTON	4.3 ab	2.7 cde	12.7 cde
EXPLORER	2.7 ab	1.0 e	4.3 e	BLACKSTONE	4.0 ab	3.0 b-e	13.0 cde
MERIT	3.3 ab	1.3 de	4.3 e	CHATEAU	4.0 ab	3.0 b-e	13.0 cde
SR 2100	2.7 ab	1.7 de	4.3 e	TOTAL ECLIPSE	5.0 a	2.7 cde	13.3 cde
CHICAGO	4.3 ab	1.0 e	4.3 e	BA 76-372	5.0 a	2.7 cde	13.3 cde
GERONIMO	2.3 ab	2.0 de	4.7 e	SODNET	3.5 ab	3.0 b-e	13.5 cde
NASSAU	3.0 ab	1.7 de	5.0 e	FAMOUS	3.0 ab	3.0 b-e	13.7 cde
BA 70-242	2.7 ab	1.7 de	5.0 e	AMERICA	4.7 ab	3.0 b-e	14.0 cde
BA 73-626	3.3 ab	1.3 de	5.0 e	RUGBY	4.3 ab	3.0 b-e	14.3 cde
LANGARA	3.8 ab	1.3 de	5.2 e	OPTI-GREEN	3.7 ab	3.7 b-e	15.3 cde
COBALT	3.7 ab	1.3 de	5.3 e	BARTITIA	4.7 ab	3.3 b-e	15.7 cde
CACHE	3.2 ab	1.7 de	5.5 e	BA 70-139	5.0 a	3.3 b-e	16.7 b-e
VICTA	4.0 ab	1.3 de	5.7 e	NEWPORT	4.7 ab	3.7 b-e	17.7 b-e
BA 79-260	3.0 ab	1.3 de	5.7 e	BA 73-540	3.3 ab	6.0 bcd	19.7 b-e
BRISTOL	4.7 ab	1.3 de	6.0 e	LIMOUSINE	5.0 a	4.0 b-e	20.0 b-e
ALENE	3.0 ab	2.0 de	6.3 e	BARCELONA	5.0 a	4.3 b-e	21.7 b-e
ASCOT	3.3 ab	1.7 de	6.3 e	GINGER	4.7 ab	4.7 b-e	21.7 b-e
BLUECHIP	2.3 ab	2.3 cde	6.3 e	TOUCHDOWN	5.0 a	4.3 b-e	21.7 b-e
CLASSIC	4.0 ab	1.7 de	6.3 e	BLACKSBURG	5.0 a	4.7 b-e	23.3 b-e
ENVICTA	3.7 ab	1.7 de	6.3 e	NUGGET	5.0 a	5.0 b-e	25.0 b-e
PARADE	3.7 ab	1.7 de	6.3 e	CYNTHIA	4.0 ab	7.0 abc	34.0 a-d
RITA	2.3 ab	2.0 de	6.3 e	BARITONE	5.0 a	7.0 abc	35.0 abc
BRILLIANT	5.0 a	1.3 de	6.7 e	COVENTRY	5.0 a	7.7 ab	38.3 ab
BA 77-700	4.0 ab	1.7 de	6.7 e	SERENE	5.0 a	10.0 a	50.0 a
INDIGO	4.3 ab	1.7 de	7.0 e				
NUBLUE	4.3 ab	1.7 de	7.0 e	LSD (P = .05)	2.171	2.64	13.202
BA 74-017	3.3 ab	2.0 de	7.0 e	Standard Deviation	1.343	1.63	8.166
HUNTSVILLE	3.0 ab	2.0 de	7.3 e	CV	38.29	71.58	86.61

For all columns, means followed by the same letter do not significantly differ (P = .05).

^a The mean disease severity was based on a scale of 0-5 where 0 = no disease symptoms and 5 = complete necrosis.

^b The mean number of patches or frog-eyes per 25 ft² plot.

^c The disease index is defined as the product of the severity and the number of patches.