

CREEPING BENTGRASS (*Agrostis palustris* 'Crenshaw')  
Brown patch; *Rhizoctonia solani*  
Dollar spot; *Sclerotinia homoeocarpa*  
Turf quality; Abiotic

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### **Evaluation of experimental fungicides for control of brown patch of creeping bentgrass, 2007.**

Experimental fungicides were evaluated for preventative control of brown patch in creeping bentgrass maintained under putting green conditions. This trial was conducted at the Lake Wheeler Turfgrass Field Laboratory in Raleigh, NC on 'Crenshaw' creeping bentgrass. Mowing was performed four times weekly at heights of 0.140 in. (11 Jan-12 Apr), 0.125 in. (13 Apr-24 May), and 0.180 in. (after 25 May) with clippings collected. The site was irrigated to prevent drought stress. Fertilizer was applied as 46-0-0 on 11 Jan and 12 Feb (0.125 and 0.25 lb N/1000 sq ft, respectively), 10-0-30 on 19 Feb (0.5 lb N/1000 sq ft), 26-0-22 on 15 Mar (0.33 lb N/1000 sq ft), 18-3-16 on 13 Apr (0.75 lb N/1000 sq ft), 18-0-12 on 11 May and 22 Jun (0.25 lb N/1000 sq ft each), and 18-9-18 on 25 May, and 2 and 30 Jul (0.6, 0.25, and 0.33 lb N/1000 sq ft, respectively). Micronutrients were applied as Brexil Multi (3.0 oz/1000 sq ft) on 12 Feb and HEP 35 (5.0 oz/1000 sq ft) on 11 May. Emerald (0.18 oz) + Daconil Weatherstik (4.0 fl oz) were applied on 15 May for control of dollar spot. Insect pests were suppressed with Allectus GC (2.9 lb/1000 sq ft) on 29 Jun. Cascade Plus (8.0 fl oz/1000 sq ft) was applied on 20 Mar and 2 May, and Revolution (6.0 fl oz/1000 sq ft) was applied on 10 Jul for improved water infiltration. Plots were 3.33 ft x 6 ft and arranged in a randomized complete block with four replications. Fungicides were applied in water equivalent to 2 gal per 1000 sq ft with a CO<sub>2</sub> powered sprayer at 40 psi using a TeeJet 9508E nozzle. All treatments were initiated on 15 Jun and were reapplied at the appropriate interval as indicated in the table. The experimental area was inoculated on 6 Jun using rye grain infested with *R. solani* isolates SRS-A, SRS-B, SRS-C, SRS-E, and SRS-F. Brown patch incidence was assessed on 16 and 25 Jul, 6, 20, and 30 Aug, and 4 Sep as the percent turf area exhibiting symptoms. Turfgrass quality was evaluated on 31 Aug using a 1 to 9 scale (9=best, 5=acceptable) based on color, density, and uniformity. Dollar spot was observed and rated on 10 Jul by counting infection centers per plot. Data were subjected to analysis of variance and means separation using the Waller-Duncan k-ratio t test (k=100).

Weather conditions were hot and dry throughout 2007, with record high temperatures and drought conditions occurring in August. Only 0.2 in. of rain fell between 14 Jun and 9 Jul. While total precipitation in July was 3.7 in., the majority of this total was recorded on 17 Jul. Brown patch incidence was light in this study, reaching a high of 16.2% in the untreated control on 25 Jul. All treatments provided good to excellent brown patch control on 25 Jul and 6 Aug. On 25 Jul, the two Daconil B treatments, Daconil C (3.6 fl oz), and NCSU-EXP-5 (0.26 and 0.52 fl oz, 21-day interval) were less effective than other treatments. On 6 Aug, Daconil B (2.0 fl oz), NCSU-EXP-5 (0.78 fl oz, 21-day interval), NCSU-EXP-9 (0.125 and 0.2 lb ai/a), and NCSU-EXP-6 (0.2 lb ai/a) were less effective than Insignia (0.9 oz, 21-day interval). By 20 Aug, NCSU-EXP-5 (0.26 and 0.52 fl oz, 21-day interval), and NCSU-EXP-7 were not significantly different from the untreated control. Brown patch symptoms declined after 20 Aug, likely due to the unfavorable weather conditions previously described. Dollar spot incidence was assessed on 10 Jul. All treatments in the study provided control of dollar spot compared to the untreated control, however Insignia (0.5 oz, 14-day interval), NCSU-EXP-9 (0.125 lb ai/a), and NCSU-EXP-7 were not as effective as the other treatments. Turf quality was evaluated on 31 Aug, and 10 of the 12 Daconil treatments, NCSU-EXP-9 (0.3 lb ai/a), and NCSU-EXP-8 (0.4 lb ai/a) exhibited acceptable quality on this date.

Treatment, formulation, and rate	Appl. interval (days)	Brown patch incidence (%)					
		16 Jul	25 Jul	6 Aug	20 Aug	30 Aug	4 Sep
Daconil Weatherstik 6F 2.0 fl oz/1000 sq ft	14*	0.2 b**	1.3 d-g	1.6 bcd	2.0 cd	1.5 cde	1.3 def
Daconil Weatherstik 6F 3.6 fl oz/1000 sq ft	21	0.0 b	1.6 c-g	1.6 bcd	1.3 d	1.3 cde	0.3 f
Daconil A L 2.0 fl oz/1000 sq ft	14	0.5 b	2.9 b-g	1.6 bcd	3.6 bcd	0.8 de	2.5 c-f
Daconil A L 3.6 fl oz/1000 sq ft	21	0.3 b	3.1 b-g	1.6 bcd	1.5 cd	0.5 de	0.5 ef
Daconil B L 2.0 fl oz/1000 sq ft	14	0.3 b	6.2 b	4.9 bc	2.5 bcd	0.5 de	1.0 def
Daconil B L 3.6 fl oz/1000 sq ft	21	0.0 b	5.1 bcd	2.9 bcd	1.5 cd	0.0 e	0.0 f
Daconil C L 2.0 fl oz/1000 sq ft	14	0.2 b	3.8 b-g	3.3 bcd	3.1 bcd	1.8 cde	3.0 c-f
Daconil C L 3.6 fl oz/1000 sq ft	21	0.0 b	5.6 bc	3.6 bcd	1.5 cd	0.0 e	0.5 ef
Daconil D L 2.0 fl oz/1000 sq ft	14	0.0 b	1.1 d-g	1.3 bcd	2.5 bcd	1.5 cde	1.3 def
Daconil D L 3.6 fl oz/1000 sq ft	21	0.0 b	1.3 d-g	2.1 bcd	1.1 d	0.0 e	0.3 f
Daconil E L 2.0 fl oz/1000 sq ft	14	0.0 b	1.0 d-g	2.6 bcd	4.1 bcd	4.8 b-e	1.3 def
Daconil E L 3.6 fl oz/1000 sq ft	21	0.3 b	3.9 b-g	3.6 bcd	1.8 cd	1.5 cde	0.5 ef
NCSU-EXP-5 0.26 fl oz/1000 sq ft	14	0.0 b	2.0 c-g	0.8 cd	3.8 bcd	2.8 b-e	4.5 a-f
NCSU-EXP-5 0.52 fl oz/1000 sq ft	14	0.0 b	0.5 fg	1.6 bcd	3.6 bcd	2.5 b-e	2.5 c-f
NCSU-EXP-5 0.78 fl oz/1000 sq ft	14	0.0 b	1.5 c-g	2.0 bcd	4.1 bcd	5.3 b-e	3.3 b-f
Tourney 50WG 0.37 oz/1000 sq ft	14	0.0 b	0.8 efg	1.8 bcd	5.1 bcd	3.8 b-e	5.0 a-f
Insignia 20WG 0.5 oz/1000 sq ft	14	0.0 b	0.2 g	1.5 bcd	4.1 bcd	7.5 ab	7.0 a-d
NCSU-EXP-5 0.26 fl oz/1000 sq ft	21	0.3 b	4.4 b-f	2.6 bcd	8.0 ab	13.0 a	6.8 a-d
NCSU-EXP-5 0.52 fl oz/1000 sq ft	21	0.5 b	4.9 b-e	3.8 bcd	7.2 abc	13.0 a	9.8 a
NCSU-EXP-5 0.78 fl oz/1000 sq ft	21	0.7 b	3.4 b-g	4.7 bc	6.7 bcd	6.0 bcd	9.8 a
Insignia 20WG 0.9 oz/1000 sq ft	21	0.0 b	0.0 g	0.2 d	2.0 cd	2.8 b-e	4.3 a-f
NCSU-EXP-9 0.125 lb ai/a	14	0.0 b	2.0 c-g	4.4 bc	4.2 bcd	3.3 b-e	8.3 abc
NCSU-EXP-9 0.200 lb ai/a	14	0.5 b	1.1 d-g	5.1 b	2.1 cd	2.0 b-e	5.5 a-f
NCSU-EXP-9 0.250 lb ai/a	14	0.0 b	2.3 b-g	3.9 bcd	3.1 bcd	3.5 b-e	6.0 a-f
NCSU-EXP-9 0.300 lb ai/a	14	0.0 b	1.8 c-g	3.3 bcd	2.8 bcd	2.3 b-e	10.0 a
NCSU-EXP-9 0.350 lb ai/a	14	0.0 b	2.6 b-g	5.2 b	2.9 bcd	4.0 b-e	7.0 a-d
NCSU-EXP-9 0.400 lb ai/a	14	0.3 b	2.8 b-g	2.6 bcd	6.5 bcd	6.8 bc	8.0 abc
Banner MAXX 1.3ME 1.0 fl oz/1000 sq ft	14	0.0 b	0.3 fg	1.5 bcd	3.1 bcd	2.3 b-e	5.0 a-f
Eagle 1.67EW 1.2 fl oz/1000 sq ft	14	0.0 b	2.6 b-g	1.6 bcd	2.9 bcd	3.3 b-e	5.8 a-f
NCSU-EXP-7 0.200 lb ai/a	14	0.2 b	2.0 c-g	3.1 bcd	8.2 ab	4.3 b-e	8.5 abc
NCSU-EXP-6 0.200 lb ai/a	14	0.0 b	1.6 c-g	5.2 b	4.6 bcd	2.5 b-e	5.3 a-f
NCSU-EXP-6 0.400 lb ai/a	14	0.0 b	2.9 b-g	1.3 bcd	3.6 bcd	4.0 b-e	7.0 a-d
NCSU-EXP-8 0.200 lb ai/a	14	0.0 b	1.1 d-g	3.6 bcd	4.4 bcd	3.5 b-e	9.3 ab
NCSU-EXP-8 0.400 lb ai/a	14	0.0 b	1.0 d-g	2.6 bcd	3.9 bcd	2.8 b-e	5.0 a-f
NCSU-EXP-10 0.200 lb ai/a	14	0.2 b	1.1 d-g	2.9 bcd	6.4 bcd	5.8 bcd	5.5 a-f
Untreated Control		9.6 a	15.8 a	16.2 a	12.6 a	5.5 b-e	6.5 a-e

\* Fungicides were applied 15 Jun (all treatments), 28 Jun (14-day treatments), 5 Jul (21-day treatments), 12 Jul (14-day treatments), 26 Jul (all treatments), 7 Aug (14-day treatments), 14 Aug (21-day treatments), 22 Aug (14-day treatments).

\*\* Values are means of four replications. Means within columns followed by the same letter are not significantly different according to the Waller-Duncan k-ratio t-test (k=100).

Treatment, formulation, and rate	Appl. interval (days)	Dollar spot incidence <sup>z</sup>	Turf quality <sup>y</sup>
		10 Jul	31 Aug
Daconil Weatherstik 6F 2.0 fl oz/1000 sq ft	14 <sup>x</sup>	2.8 cde <sup>w</sup>	5.8 a-e
Daconil Weatherstik 6F 3.6 fl oz/1000 sq ft	21	0.0 e	6.5 ab
Daconil A L 2.0 fl oz/1000 sq ft	14	0.0 e	5.8 a-e
Daconil A L 3.6 fl oz/1000 sq ft	21	0.0 e	6.3 abc
Daconil B L 2.0 fl oz/1000 sq ft	14	0.0 e	6.5 ab
Daconil B L 3.6 fl oz/1000 sq ft	21	0.0 e	7.0 a
Daconil C L 2.0 fl oz/1000 sq ft	14	0.0 e	4.5 d-h
Daconil C L 3.6 fl oz/1000 sq ft	21	0.0 e	6.0 a-d
Daconil D L 2.0 fl oz/1000 sq ft	14	0.0 e	5.5 a-f
Daconil D L 3.6 fl oz/1000 sq ft	21	0.0 e	6.8 a
Daconil E L 2.0 fl oz/1000 sq ft	14	1.3 de	4.3 e-i
Daconil E L 3.6 fl oz/1000 sq ft	21	0.0 e	5.5 a-f
NCSU-EXP-5 0.26 fl oz/1000 sq ft	14	0.0 e	4.3 e-i
NCSU-EXP-5 0.52 fl oz/1000 sq ft	14	0.0 e	4.8 c-g
NCSU-EXP-5 0.78 fl oz/1000 sq ft	14	0.0 e	4.5 d-h
Tourney 50WG 0.37 oz/1000 sq ft	14	0.0 e	4.0 f-j
Insignia 20WG 0.5 oz/1000 sq ft	14	9.3 b	3.8 g-j
NCSU-EXP-5 0.26 fl oz/1000 sq ft	21	0.0 e	2.8 ij
NCSU-EXP-5 0.52 fl oz/1000 sq ft	21	0.0 e	3.0 hij
NCSU-EXP-5 0.78 fl oz/1000 sq ft	21	0.0 e	3.8 g-j
Insignia 20WG 0.9 oz/1000 sq ft	21	0.0 e	4.8 c-g
NCSU-EXP-9 0.125 lb ai/a	14	6.5 bc	3.8 g-j
NCSU-EXP-9 0.200 lb ai/a	14	1.0 de	4.3 e-i
NCSU-EXP-9 0.250 lb ai/a	14	0.0 e	4.3 e-i
NCSU-EXP-9 0.300 lb ai/a	14	0.3 e	5.0 b-g
NCSU-EXP-9 0.350 lb ai/a	14	0.0 e	4.3 e-i
NCSU-EXP-9 0.400 lb ai/a	14	0.0 e	3.5 g-j
Banner MAXX 1.3ME 1.0 fl oz/1000 sq ft	14	0.0 e	3.5 g-j
Eagle 1.67EW 1.2 fl oz/1000 sq ft	14	0.0 e	3.8 g-j
NCSU-EXP-7 20WP 0.200 lb ai/a	14	5.8 bcd	3.8 g-j
NCSU-EXP-6 0.200 lb ai/a	14	0.5 e	4.8 c-g
NCSU-EXP-6 0.400 lb ai/a	14	0.0 e	4.8 c-g
NCSU-EXP-8 0.200 lb ai/a	14	0.0 e	4.8 c-g
NCSU-EXP-8 0.400 lb ai/a	14	0.0 e	5.0 b-g
NCSU-EXP-10 0.200 lb ai/a	14	2.5 cde	4.5 d-h
Untreated Control		44.8 a	2.5 j

<sup>z</sup> Number of infection centers per plot.

<sup>y</sup> Turfgrass quality on a 1 to 9 scale, where 9=highest quality, and 5=acceptable.

<sup>x</sup> Fungicides were applied 15 Jun (all treatments), 28 Jun (14-day treatments), 5 Jul (21-day treatments), 12 Jul (14-day treatments), 26 Jul (all treatments), 7 Aug (14-day treatments), 14 Aug (21-day treatments), 22 Aug (14-day treatments).

<sup>w</sup> Values are means of four replications. Means within columns followed by the same letter are not significantly different according to the Waller-Duncan k-ratio t-test (k=100).