

Impact of fungicides applied for brown patch control on anthracnose development in creeping bentgrass, 2007.

This trial was initially designed to evaluate fungicides for preventative control of brown patch in creeping bentgrass. While brown patch symptoms failed to develop, an anthracnose epidemic occurred during the course of the experiment. This trial was conducted at the Lake Wheeler Turfgrass Field Laboratory in Raleigh, NC on 'Dominant Plus' creeping bentgrass maintained under golf course putting green conditions. 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 16 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 10 May and 22 Jun (0.25 lb N/1000 sq ft), 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 10 May. 26GT (3.5 fl oz/1000 sq ft) and Emerald + Daconil Weatherstik (0.18 oz + 4.0 fl oz/1000 sq ft) were applied on 12 Mar and 15 May, respectively, 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 for improved water infiltration. Plots were 3.33 ft x 6 ft and were arranged in a randomized complete block with four replications. Fungicides were applied in water equivalent to 2 gal per 1000 sq ft with a CO₂ powered sprayer at 40 psi using a TeeJet 9508E nozzle. Granular treatments were dispensed to dry turf using a shaker jar, and immediately irrigated with 0.125 in. of water. Sprayer-applied treatments were applied post-irrigation. All treatments were initiated on 15 Jun and re-applied at the appropriate intervals 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 to encourage brown patch development. As previously noted, brown patch symptoms failed to develop in this study. Anthracnose symptoms were observed and evaluated on 2, 6, and 20 Jul, and 3, 17, and 30 Aug. Turfgrass quality was evaluated on 30 Aug using a 1 to 9 scale (9=best, 5=acceptable) based on color, density, and uniformity. Data were subjected to analysis of variance and means separation using the Waller-Duncan k-ratio t test (k=100).

Anthracnose incidence was highly variable in the experiment. During July, symptomatic turf ranged from 8.8 to 10.5% in untreated plots. Temperatures in Raleigh were normal in May, June, and July, but abnormally high in August with high temperatures exceeding 90°F on 25 days and 100°F on 6 days. Over the same period, precipitation was nearly 5 in. below normal, and monthly totals resulted from only a few rain events, translating into several 2-3 week periods of no precipitation. On the three July rating dates, anthracnose incidence in plots treated with Heritage TL (2.0 fl oz, 14-day interval) was significantly higher than in untreated plots. Similar results occurred on 6 Jul with Heritage TL (1.0 fl oz, 14-day interval) and Rhapsody + Heritage TL. On the 6 Jul rating date, Tartan II (1.9 fl oz) was the only treatment to provide significant reductions in anthracnose incidence. On 20 Jul, Tartan II (all rates) and Lynx (all rates) provided significant anthracnose suppression. Disease incidence declined in August, perhaps due to the extreme weather conditions. During this period, no significant differences were observed among treatments. On 30 Aug, only the three Tartan II treatments exhibited acceptable turf quality. No phytotoxicity was observed in the study.

| Treatment, formulation, and rate per 1000 sq ft | Appl. interval (days) | Anthracnose incidence (%) | | | |
|---|-----------------------------|---------------------------|----------|----------|----------|
| | | 2 Jul | 6 Jul | 20 Jul | 3 Aug |
| Rhapsody L 5.0 fl oz + Heritage TL 0.8ME 1.0 fl oz | 14 ^z | 10.0 a-d ^y | 27.1 a | 15.4 abc | 9.2 a-f |
| Heritage TL 0.8ME 1.0 fl oz | 14 | 10.8 abc | 21.4 abc | 15.8 abc | 14.2 a |
| Tartan II 2SC 1.0 fl oz | 14 | 0.8 ef | 1.5 jkl | 0.0 l | 2.1 def |
| Tartan II 2SC 1.3 fl oz | 14 | 2.1 b-f | 1.5 jkl | 0.7 l | 6.5 a-f |
| Tartan II 2SC 1.9 fl oz | 14 | 0.2 f | 0.0 l | 0.2 l | 1.0 f |
| Lynx 2SC 0.75 fl oz | 14 | 0.3 f | 0.7 kl | 0.3 l | 1.3 ef |
| Lynx 2SC 1.0 fl oz | 14 | 0.2 f | 1.1 jkl | 0.2 l | 5.1 a-f |
| Lynx 2SC 1.5 fl oz | 14 | 0.3 f | 0.5 kl | 0.2 l | 2.9 def |
| Nativo 2.5SC 1.2 fl oz | 14 | 1.8 c-f | 2.6 g-l | 0.8 kl | 10.3 a-f |
| Headway 1.39ME 1.5 fl oz | 14 | 2.8 b-f | 3.6 g-l | 2.0 jkl | 11.9 a-d |
| A-14912-A 0.31GR 32.2 oz | 14 | 5.4 b-f | 11.4 c-j | 11.6 b-h | 11.4 a-e |
| A-14912-A 0.31GR 64.5 oz | 14 | 8.3 b-f | 14.2 b-f | 12.7 b-f | 13.4 abc |
| A-14912-C 0.31GR 32.2 oz | 14 | 10.6 abc | 8.3 d-l | 13.2 b-e | 9.6 a-f |
| A-14912-C 0.31GR 64.5 oz | 14 | 8.0 b-f | 15.0 b-e | 7.8 b-l | 10.8 a-f |
| A-14912-A 0.31GR 32.2 oz | 21 | 9.5 a-e | 12.4 c-g | 10.9 b-i | 9.5 a-f |
| A-14912-A 0.31GR 64.5 oz | 21 | 4.9 b-f | 4.2 f-l | 5.2 e-l | 5.1 a-f |
| A-14912-C 0.31GR 32.2 oz | 21 | 4.4 b-f | 12.1 c-h | 10.6 b-j | 9.3 a-f |
| A-14912-C 0.31GR 64.5 oz | 21 | 11.1 ab | 11.9 c-i | 12.4 b-g | 8.5 a-f |
| Heritage TL 0.8ME 1.01 fl oz | 14 | 3.9 b-f | 8.7 d-l | 10.9 b-i | 5.4 a-f |
| Heritage TL 0.8ME 2.0 fl oz | 14 | 18.3 a | 24.0 ab | 22.9 a | 12.3 a-d |
| Heritage TL 0.8ME 1.01 fl oz | 21 | 6.2 b-f | 10.0 d-l | 10.6 b-j | 6.4 a-f |
| Heritage TL 0.8ME 2.02 fl oz | 21 | 6.4 b-f | 14.2 b-f | 16.2 ab | 13.4 abc |
| Insignia 20WG 0.5 oz | 14 | 3.4 b-f | 9.0 d-l | 12.6 b-f | 6.7 a-f |
| Insignia 20WG 0.9 oz | 21 | 1.8 c-f | 5.9 e-l | 5.9 d-l | 5.7 a-f |
| SARS-346 40WP 0.5 oz | 14 | 1.3 def | 0.7 kl | 2.5 i-l | 4.4 a-f |
| SARS-346 40WP 0.75 oz | 14 | 0.7 ef | 1.6 i-l | 3.3 h-l | 6.7 a-f |
| SARS-346 40WP 0.4 oz + 3336 50WP 1.44 oz | 14 | 2.8 b-f | 2.0 h-l | 3.8 g-l | 3.1 c-f |
| SARS-346 40WP 0.4 oz + 3336 50WP 2.0 oz | 14 | 2.5 b-f | 4.7 e-l | 5.7 e-l | 6.0 a-f |
| Disarm 4SC 0.18 fl oz | 14 | 4.2 b-f | 10.8 d-k | 10.5 b-j | 7.0 a-f |
| Disarm 4SC 0.18 fl oz | 21 | 9.6 a-e | 14.1 b-f | 14.5 a-d | 14.2 a |
| Disarm 4SC 0.36 fl oz | 28 | 5.7 b-f | 18.0 a-d | 10.8 b-i | 13.9 ab |
| ARY 0534001 SC 0.18 fl oz + Disarm 4SC 0.05 fl oz | 14 | 3.4 b-f | 7.4 e-l | 7.4 c-l | 5.1 a-f |
| ARY 0534001 SC 0.35 fl oz + Disarm 4SC 0.1 fl oz | 28 | 2.1 b-f | 6.4 e-l | 5.1 e-l | 3.8 b-f |
| Disarm 4SC 0.18 fl oz + Daconil Ultrex 82.5WG 1.8 oz | 21 | 3.1 b-f | 1.5 jkl | 2.8 i-l | 4.4 a-f |
| Disarm 4SC 0.18 fl oz <i>Alt</i> Banner MAXX 1.3ME 1.0 fl oz ^x | 21 | 3.3 b-f | 4.2 f-l | 4.1 f-l | 2.5 def |
| Untreated Control | | 8.8 b-f | 10.5 d-k | 9.5 b-k | 6.7 a-f |

^z Fungicides were applied on 11 Jun (all treatments), 25 Jun (14-day treatments), 2 Jul (21-day treatments), 9 Jul (14 and 28-day treatments), 23 Jul (14 and 21-day treatments), 6 Aug (14 and 28-day treatments), 14 Aug (21-day treatments), 20 Aug (14-day treatments).

^y 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).

^x Fungicides were alternated on a 21-day interval: Disarm applied 11 Jun and 23 Jul; and Banner MAXX applied 2 Jul and 14 Aug.

| Treatment, formulation, and rate per 1000 sq ft | Appl. interval (days) | Anthracnose incidence (%) | | Turf quality |
|---|-----------------------|---------------------------|---------|--------------|
| | | 17 Aug | 30 Aug | 30 Aug |
| Rhapsody L 5.0 fl oz + Heritage TL 0.8ME 1.0 fl oz | 14 ^z | 8.5 abc ^y | 5.0 abc | 3.0 fgh |
| Heritage TL 0.8ME 1.0 fl oz | 14 | 14.1 a | 6.5 ab | 3.5 d-h |
| Tartan II 2SC 1.0 fl oz | 14 | 0.7 c | 0.5 c | 6.0 ab |
| Tartan II 2SC 1.3 fl oz | 14 | 3.8 abc | 2.0 abc | 5.5 abc |
| Tartan II 2SC 1.9 fl oz | 14 | 0.8 c | 1.0 bc | 6.3 a |
| Lynx 2SC 0.75 fl oz | 14 | 1.8 bc | 1.8 abc | 4.5 cde |
| Lynx 2SC 1.0 fl oz | 14 | 2.5 abc | 3.0 abc | 4.8 bcd |
| Lynx 2SC 1.5 fl oz | 14 | 2.1 abc | 1.5 abc | 4.8 bcd |
| Nativo 2.5SC 1.2 fl oz | 14 | 4.7 abc | 4.8 abc | 4.3 c-f |
| Headway 1.39ME 1.5 fl oz | 14 | 6.7 abc | 4.0 abc | 3.5 d-h |
| A-14912-A 0.31GR 32.2 oz | 14 | 4.2 abc | 3.0 abc | 3.0 fgh |
| A-14912-A 0.31GR 64.5 oz | 14 | 11.6 abc | 6.5 ab | 3.5 d-h |
| A-14912-C 0.31GR 32.2 oz | 14 | 6.5 abc | 3.5 abc | 3.8 d-h |
| A-14912-C 0.31GR 64.5 oz | 14 | 6.0 abc | 4.5 abc | 3.8 d-h |
| A-14912-A 0.31GR 32.2 oz | 21 | 4.7 abc | 3.8 abc | 3.3 e-h |
| A-14912-A 0.31GR 64.5 oz | 21 | 3.9 abc | 2.3 abc | 3.8 d-h |
| A-14912-C 0.31GR 32.2 oz | 21 | 6.5 abc | 5.0 abc | 3.5 d-h |
| A-14912-C 0.31GR 64.5 oz | 21 | 10.6 abc | 3.5 abc | 2.8 gh |
| Heritage TL 0.8ME 1.01 fl oz | 14 | 2.5 abc | 2.8 abc | 3.0 fgh |
| Heritage TL 0.8ME 2.0 fl oz | 14 | 6.2 abc | 3.8 abc | 3.3 e-h |
| Heritage TL 0.8ME 1.01 fl oz | 21 | 2.0 bc | 2.8 abc | 4.3 c-f |
| Heritage TL 0.8ME 2.02 fl oz | 21 | 10.1 abc | 4.5 abc | 3.3 e-h |
| Insignia 20WG 0.5 oz | 14 | 8.5 abc | 4.5 abc | 3.3 e-h |
| Insignia 20WG 0.9 oz | 21 | 7.2 abc | 3.8 abc | 3.5 d-h |
| SARS-346 40WP 0.5 oz | 14 | 2.8 abc | 1.3 bc | 3.8 d-h |
| SARS-346 40WP 0.75 oz | 14 | 2.6 abc | 2.8 abc | 3.8 d-h |
| SARS-346 40WP 0.4 oz + 3336 50WP 1.44 oz | 14 | 2.0 bc | 2.0 abc | 3.8 d-h |
| SARS-346 40WP 0.4 oz + 3336 50WP 2.0 oz | 14 | 2.8 abc | 3.5 abc | 3.8 d-h |
| Disarm 4SC 0.18 fl oz | 14 | 3.1 abc | 2.0 abc | 3.8 d-h |
| Disarm 4SC 0.18 fl oz | 21 | 13.1 ab | 7.3 a | 2.5 h |
| Disarm 4SC 0.36 fl oz | 28 | 5.1 abc | 5.8 abc | 3.0 fgh |
| ARY 0534001 SC 0.18 fl oz + Disarm 4SC 0.05 fl oz | 14 | 2.6 abc | 4.0 abc | 4.5 cde |
| ARY 0534001 SC 0.35 fl oz + Disarm 4SC 0.1 fl oz | 28 | 0.7 c | 1.3 bc | 4.5 cde |
| Disarm 4SC 0.18 fl oz + Daconil Ultrex 82.5WG 1.8 oz | 21 | 3.8 abc | 1.3 bc | 4.3 c-f |
| Disarm 4SC 0.18 fl oz + <i>Alt</i> Banner MAXX 1.3ME 1.0 fl oz ^x | 21 | 5.9 abc | 3.0 abc | 4.0 d-g |
| Untreated Control | | 5.4 abc | 3.8 abc | 2.5 h |

^z Fungicides were applied on 11 Jun (all treatments), 25 Jun (14-day treatments), 2 Jul (21-day treatments), 9 Jul (14 and 28-day treatments), 23 Jul (14 and 21-day treatments), 6 Aug (14 and 28-day treatments), 14 Aug (21-day treatments), 20 Aug (14-day treatments).

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