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Fungicide application timing with effects on grey leaf spot and southern rust in Nebraska field corn, 2015.

The objective of the trial was to compare foliar fungicides applied to three growth stages of corn for grey leaf spot (GLS) and southern rust (SR) efficacy. Irrigated corn was grown based on Nebraska Extension irrigation recommendations at the South Central Ag Lab near Clay Center, NE. Soils were a silt loam with 6.7 pH and 1.8 % OM and the previous crop was soybean. Reduced tillage was performed to the field prior to planting. Corn (DKC 65-79 RIB, tolerant to gray leaf spot) was planted at approximately 34,000 seed/A on 26 May. Eight treatments were arranged in a randomized complete block design with six replications. Fungicide treatments were applied using a high-clearance sprayer equipped with a 10 ft wide spray boom housing six TeeJet XR11002 spray nozzles with 20-in. spacing. Spray solutions were delivered at 3 mph with 40 psi compressed air for a spray volume of 20 gpa. Treatments were applied to V6- (29 Jun), V8- (8 Jul), and at R1- (7 Aug) stage corn. Plots were assessed for phytotoxicity, GLS and SR severity (5 Oct), stay green (16 Oct), and stalk lodging (5 Nov). Corn stalk lodging (push lodging) was assessed by pushing 20 random stalks, at shoulder height, to the 45° position. Plots were taken to yield from the center two rows using a Gleaner K2 plot combine (10 Nov). Grain yield was adjusted to 15.5% moisture. All treatments were analyzed using ANOVA, and means were separated using Fisher's protected LSD with $P = 0.10$. Precipitation was greater than normal in Jun (8.05 in. vs 2.9 in.), and 4.74 in. rain fell on 4 Jun. The longest rain-free period occurred from 20 Aug to 3 Sep. An overhead linear-move sprinkler irrigator delivered approximately 1.6 in. water to the trial on 18, 27, and 29 Jul, 17, 24 Aug, and 1 Sep. Average monthly temperatures (°F) were 72 (Jun), 76 (Jul), 73 (Aug), 72 (Sep) and 58 (Oct). The hottest month was Jul with a high of 97°F on 5 Jul. The longest consecutive days with temperatures >90°F occurred 31 Aug to 6 Sep. High temperatures at the R1 through R2 stage (29 Jul - 13 Aug) ranged in the low-80s (°F) and decreased to the mid-70s (°F).

Treatments applied to corn at V6, V8, and R1 did not cause phytotoxicity (data not presented). GLS severity was significantly less in plots treated with Headline AMP 10 fl oz at R1 compared to other fungicides applied at V6, V8, and the non-treated check. SR severity was significantly less when plots were treated with fungicides at R1 compared to V6, V8, and the non-treated check. Further at R1, SR severity was significantly less when plots were treated with Headline AMP 10 oz compared to Topguard 5 oz and Equation 6 oz. Stay green was significantly greater when plots were treated at R1 with Headline AMP 10 oz and Topguard 5 oz compared to other fungicides and the non-treated check. There were no significant differences between fungicides and the non-treated check for push lodging or yield.

| Treatment, Formulation, Rate/A ^z | Timing ^y | GLS Severity ^x % | SR Severity ^x % | Stay Green ^w % | Push Lodging ^w % | Yield bu/A |
|---|---------------------|--------------------------------|-------------------------------|------------------------------|--------------------------------|---------------|
| Non-treated Check | - | 7.3 a ^v | 15.4 ab | 22 cd | 27 | 259 |
| Equation 2.08 SC, 6 fl oz | V6 | 7 a | 13.5 b | 20 d | 21 | 265 |
| Fortix 3.22 SC, 5 fl oz | V6 | 5 bc | 12.9 b | 23.5 cd | 18 | 237 |
| Topguard 1.04 SC, 5 fl oz | V6 | 6.3 ab | 19.9 a | 20.2 d | 20 | 236 |
| Topguard 1.04 SC, 5 fl oz | V8 | 4.7 c | 14.1 b | 24.3 cd | 19 | 258 |
| Equation 2.08 SC, 6 fl oz | R1 | 4.7 c | 4.1 c | 26.7 bc | 12 | 235 |
| Headline AMP 1.66 SE, 10 fl oz | R1 | 2.9 d | 2.5 d | 37.5 a | 11 | 255 |
| Topguard 1.04 SC, 5 fl oz | R1 | 3.7 cd | 4.8 c | 29.3 b | 13 | 254 |
| <i>P</i> -value | | 0.0001 | 0.0001 | 0.0001 | 0.3321 | 0.1625 |
| CV % | | 30.2 | 12.8 | 19.3 | 69.9 | 9.23 |

^z All treatments were applied with NIS @ 0.25% v/v.

^y V6 application = 29 Jun; V8 application = 8 Jul; R1 application = 7 Aug.

^x GSL severity and SR severity evaluated on 5 Oct 2015.

^w Stay green determined by visually estimating the amount of green foliage in each plot (16 Oct 2015).

^w Push lodging = % lodged stalks when pushed from shoulder height to the 45° position from vertical, and evaluated on 5 Nov 2015.

^v Data followed by the same letter or without letters within a column are not significantly different at $P = 0.10$ according to Fisher's protected LSD test.