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Effects of early application timing of foliar fungicides in field corn in central Nebraska, 2011.

A foliar fungicide early application timing trial was conducted at the University of Nebraska-Lincoln South Central Agricultural Laboratory near Clay Center, NE. Dekalb corn hybrid DKC 62-54, rating of “good” (6 out of 9) for gray leaf spot (GLS) and “excellent” (2 out of 9) for common rust (CR), was planted on 3 May in 30 in. rows with a target population of 32,000 plants/A. The trial area was disked with a crop history of seven years of continuous corn. On 9 May before plant emergence, a herbicide program of Roundup (1 pt/A), Verdict (16 fl oz/A) and Atrazine (1 lb/A) was applied to the trial site. Seven treatments and a non-treated control were replicated six times in a randomized complete block design. Each plot was four rows (10 ft) wide by 40 ft in length. Foliar fungicides were applied with a modified high-clearance sprayer. The 10 ft spray boom consisted of six nozzles (TeeJet XR11002) spaced 20 in. apart and 18 in. above the canopy. Each treatment was applied at 40 psi traveling 3.0 mph resulting in a 20 gal/A application volume. Foliar fungicides were applied on 13 Jun (V6) and 15 Jul (VT/R1). Gray leaf spot and common rust disease severity was assessed by estimating percent leaf area covered with lesions over the entire plot on 13 Jun (V6), 11 Jul (V16), 13 Jul (V17/V18), 11 Aug (R4), and 25 Aug (R5, milk line ¼ down from the kernel top). These data were used to calculate area under the disease progress curve (AUDPC). Corn lodging was assessed on 7 Oct as the percentage of corn stalks lodged below the ear from 50 stalks pushed from the standing 12 o'clock position to the 2 o'clock position (45° angle). Stay green percentage was assessed on 19 Sep as the percentage of green leaf material remaining on the plant averaged through the plot. All data assessments were taken from the two center rows of each plot, except push lodging was done in the two outside rows. Grain was mechanically harvested with a two-row research combine on 18 Oct. The ends of plots were trimmed prior to harvest and the harvested area of each plot was measured following harvest and used to calculate yield. Data were subjected to analysis of variance and means were compared at the 0.05 significance level using Waller-Duncan k-ratio t test. Monthly rainfall and temperature readings recorded at South Central Agricultural Lab were relatively normal during the growing season although temperatures did get very warm during the VT and R1 growth stages. However, scouting observations of corn ears did not indicate that temperatures appeared to affect kernel and ear development. Supplemental water was added to this trial as needed by an overhead sprinkler linear irrigation system.

GLS was the predominant foliar disease present in this trial. Percent severity remained low and fairly level through the growing season with severity levels not exceeding 3.3% for any treatment on any assessment date. GLS was not visually observed at the time of the VT/R1 application but GLS lesions were identified on the ear leaf by early Aug. CR severity was 0.1% at the time of the VT/R1 application and severity did not exceed 0.4% for any treatment on any assessment date. Common smut, Physoderma brown spot, and southern rust occurred at very low severity levels and their severity was not assessed. The area under the disease progress curve calculations indicated all foliar fungicide treatments at all application timings reduced GLS severity as compared to the non-treated control. All foliar fungicide treatments at all application timings, except Headline AMP, 10 fl oz/A at V6, reduced CR severity as compared to the non-treated control. Headline AMP, 10 fl oz/A at VT/R1, the only treatment with a VT/R1 application, exhibited the lowest GLS and CR AUDPC values. Push lodging ranged from 6.7% for Headline AMP, 10 fl oz/A at VT/R1 to 9.3% for Quadris, 6 fl oz/A at V6. Headline AMP, 10 fl oz/A at VT/R1, exhibited the highest level of stay green at 31.1%. 500 count kernel weights ranged from 6.26 oz to 6.35 oz with no statistical differences between treatments. There were no statistical differences in grain moisture or yield among all treatments. Grain moisture at harvest ranged from 14.6% to 14.9% with the highest moisture percentage occurring in Headline AMP, 10 fl oz/A at VT/R1. Yields ranged from 228.6 bu/A to 242.5 bu/A with the highest yield occurring in the non-treated control.

Treatment, Rate/A, Timing	GLS AUDPC ^z	CR AUDPC	Lodging (%) ^y	Stay Green (%) ^x	500 Kernel Weight (oz)	Grain Moisture (%)	Dry Yield (bu/A) ^w
Non-Treated Control.....	83.1 a ^v	9.1 a	7.0	24.1 b	6.26	14.7	242.5
Headline 2.09 SC ^u , 6 fl oz, V6.....	62.8 b	7.9 ab	9.0	23.7 b	6.28	14.6	228.6
Headline AMP 1.67 SC ^u , 10 fl oz, V6.....	57.8 bc	9.1 a	7.7	26.3 b	6.33	14.7	237.4
Priaxor 4.17 SC ^u , 4 fl oz, V6.....	46.8 bc	6.0 b	9.0	25.0 b	6.31	14.6	239.3
BAS 500 20F ^u , 6 fl oz, V6.....	59.0 bc	6.3 ab	7.3	23.7 b	6.29	14.7	229.2
Quadris 2.08 SC ^u , 6 fl oz, V6.....	53.3 bc	7.4 ab	9.3	26.3 b	6.35	14.7	229.0
Stratego YLD 4.18 SC ^u , 4 fl oz, V6.....	42.4 c	7.4 ab	7.0	26.8 ab	6.32	14.8	234.4
Headline AMP 1.67 SC ^t , 10 fl oz, VT/R1.	16.7 d	6.0 b	6.7	31.1 a	6.26	14.9	241.7
Coefficient of Variation (%)	29.6	27.2	73.6	13.2	1.9	1.6	5.5

^zArea under the disease progress curve.

^yLodging was estimated as the percentage of corn stalks lodged below the ear from 50 stalks pushed to arm's length.

^xStay green was estimated as the percentage of green leaves remaining on the plant.

^wYield calculations adjusted to a moisture content of 15.5%.

^vData followed by the same letter or without letters within a column are not statistically different ($P > 0.05$) according to the Waller-Duncan k-ratio t test.

^uTreatment included Roundup PowerMax, 22 fl oz/A

^tTreatment included non-ionic surfactant (NIS), 0.25% V/V