

2015

Foliar Fungicide Comparisons for Gray Leaf Spot Management and Lodging in Nebraska Field Corn, 2014

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Harbour, J. D. and Jackson-Ziems, T. A., "Foliar Fungicide Comparisons for Gray Leaf Spot Management and Lodging in Nebraska Field Corn, 2014" (2015). *Papers in Plant Pathology*. 498.

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Foliar fungicide comparisons for gray leaf spot management and lodging in Nebraska field corn, 2014.

The objective of the trial was to compare foliar fungicides with other fungicide programs for gray leaf spot (GLS) efficacy. Corn was grown under normal, irrigated agronomic practices at the South Central Ag Lab near Clay Center, NE. Soils were a silt loam with 6.7 pH and 1.8 % organic matter, and the previous crop was corn. Reduced tillage was performed to the field prior to planting. Corn (DKC 64-83 RIB, moderately susceptible to GLS) was planted at approximately 34,000 seed/A on 20 May. Eleven 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 inch spacing. Spray solutions were delivered at 3 mph with 40 psi compressed air for a spray volume of 20 gpa. Treatments were applied to corn on 25 Jun (V5) and on 21 Jul (R1). Treatments were assessed for phytotoxicity, stay green, and the area under the disease progress curve (AUDPC) was calculated from four evaluations conducted on 28 Jul, 8 Aug, 20 Aug, and 15 Sep. Excessive wind and hail occurred on 1 Oct causing stalk lodging (i.e., wind lodging). Wind lodging data were collected on 10 Oct and calculated by counting the number of lodged stalks in the center two rows, dividing by the total number of stalks in the two rows, and expressing the data as a percentage. Corn stalk lodging (push lodging) was assessed (28 Oct) by pushing 20 random stalks at shoulder height to the 45° position from vertical. Plots were harvested on 14 Nov from the center two rows using a Gleaner K2 plot combine with yields corrected to 15.5% moisture. All treatments were analyzed using ANOVA and means separated using Fisher's protected LSD with $P = 0.10$. Precipitation was greater than normal in Jun (8.9 in. vs 2.9 in.), and 3.3 in rain fell on 21 Jun. The longest dry spell occurred from 11 Jul to 31 Jul. An overhead linear sprinkler delivered approximately 1.75 in. water to the trial on 22 Jul, 29 Jul, and 2 Aug. Temperature highs were warmer than average in May, and the longest warm spell occurred from 18 May to 7 Jun. Average monthly temperatures for Jul and Aug were in the mid-80s (°F). The hottest month was Jul with a high of 99°F on 21 Jul. High temperatures at the R1 growth stage ranged from the low-90s (°F) and decreased to the mid-70s (°F).

Phytotoxicity was not observed from any of the treatments at 10 DAT (data not shown). GLS was first observed on 28 Jul and progressed slowly. GLS severity was estimated as total plot leaf area covered with lesions (%), as well as how high on the plant recognizable lesions developed above the ear leaf (leaf number). At 18 DAT, GLS was present nearly two leaves above the ear leaf when treated with Headline AMP (R1); and, significantly lower when compared to all other treatments applied at V5. By 30 DAT, GLS was confined to leaves 5 and 6 from R1 treatments while GLS was present on leaves 6 and 7 from V5 treatments and the nontreated check. Stay green was significantly greater with all R1- versus V5-applied fungicides and the nontreated check. Plots treated with Headline AMP were significantly greener than all other treatments. Correspondingly, AUDPC values were significantly lower in plots treated at R1 versus V5. Custodia and Headline AMP applied at R1 significantly reduced wind lodging compared to V5-applied Custodia 6 fl oz, Fortix, Orius, and Quadris. Push lodging was significantly less when plots were treated with Headline at R1 compared to Custodia treatments and the nontreated check. Yields were nonsignificant between fungicides and the nontreated check. Overall, fungicides applied at R1 reduced GLS severity and increased stay green.

Treatment, Formula, Rate/A, Timing ^z	GLS		Stay Green ^w %	AUDPC ^v %	Lodging		Yield bu/A
	Leaf No.	Position (n) ^y			Wind ^u %	Push ^t %	
	18 DAT ^x	30 DAT					
Custodia 2.67 SC, 4.5 fl oz V5	3.2 ab ^s	6.7 a	70.9 de	359.4 b	2.8 bcd	76.7 a	269.1
Custodia 2.67 SC, 6 fl oz V5	2.8 bcd	6.3 ab	70.4 de	356.2 b	5.4 ab	74.0 ^f	269.8
Custodia 2.67 SC, 9 fl oz V5	2.5 c	7.1 a	69.0 de	414.4 ab	2.9 bcd	70.0 a-d	258.1
Headline 2.08 SC, 10 fl oz V5	3.1 abc	6.7 a	68.3 de	411.4 ab	2.6 bcd	47.8 de	258.8
Fortix 2.22 F, 5 fl oz V5	3.6 a	6.9 a	71.4 d	363.2 b	3.6 bc	56.1 a-e	250.9
Orius 3.6 F, 3 fl oz V5	3.1 abc	7.1 a	66.6 e	467.8 a	7.8 a	73.8 abc	250.2
Quadris 2.08 F, 2.88 fl oz V5	2.7 bcd	6.8 a	69.8 de	404.1 ab	4.0 abc	50.8 cde	259.8
Custodia 2.67 SC, 12.8 fl oz R1	2.3 de	5.5 bc	84.7 b	247.4 c	1.1 d	50.0 de	259.7
Quilt Xcel 3.18 SE, 10.5 fl oz R1	2.3 de	4.2 d	77.9 c	255.4 c	1.9 cd	52.3 b-e	251.9
Headline AMP 1.66 SE, 10 fl oz R1	1.9 e	5.2 c	89.5 a	206.1 d	1.2 d	40.8 e	263.2
Nontreated check	2.6 cd	6.8 a	65.8 de	443.3 a	4.4 abc	75.0 ab	253.2
CV%	12.08	13.65	5.15	3.01	45.64	39.97	5.61

^z V5 application = 13 Jun 2014; R1 application = 21 Jul 2014.

^y Leaf No. corresponds to leaf number above the ear-leaf where the ear-leaf = 0.

^x Assessed 18 DAT (days after treatment) from the R1 application.

^w Stay green = determined by visually assessing the amount of green foliage on the corn plant; 20 Aug 2014.

^v Area under the disease progress curve, calculated from three rating dates of 28 Jul, 8 Aug, and 20 Aug, 2014.

^u Lodging estimated following wind and hail event on 1 Oct and assessed 10 Oct, 2014.

^t Push lodging = % lodged stalks when pushed from shoulder height to the 45° from vertical; 8 Nov 2014.

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

^f Missing data values and thus unable to provide means separation.