

Evaluation of foliar fungicides for control of Fusarium head blight, 2020.

An experiment was established at the Kansas State University, Rocky Ford Research Station in Manhattan, KS. Soil was a Chase silty clay loam (pH = 6.5). The experiment was planted in a randomized complete block design with four replications of eight treatments, including two check treatments. Check treatments included a non-sprayed inoculated check (untreated), and a "healthy" check that was treated with Miravis Ace on 01 May, 06 May, 09 May, and 27 May 2020. The Fusarium head blight susceptible hard red winter wheat variety ‘Larry’ was seeded (67.25 kg/ha) into 1.5-m by 3-m plots on 01 Oct 2019. Corn kernel inoculum was grown with two aggressive *Fusarium graminearum* isolates (GZ-3639, Pt-1-04) and air-dried. Inoculum was spread onto the plots at a rate of 53 g/m² on 12 Apr, 27 Apr, and 12 May 2020. During anthesis, the nursery was mist irrigated to improve *F. graminearum* conditions for 5 minutes every 4 hours throughout the night for a total of 20 minutes per night. Treatment applications were made at the rate of 187 L/ha using a backpack CO₂ sprayer equipped with flat-fan nozzles (8002 VS) with 0.51m spacing at 207 kPa (30 psi). All fungicide treatments contained 0.125% (v/v) Induce surfactant. All treatments were applied on 5/9/20 when the Feekes plant growth stage averaged 10.5. The mean heading Julian date was 122.4 (50% headed tillers). FHB index was rated on 21 May, 24 May, 27 May, 29 May, 31 May, 02 Jun, and 04 Jun 2020 by determining the percent of symptomatic spikelets. Plots were harvested on 24 Jun 2020. Area under the disease progress stairs (AUDPS) and the least significant difference (LSD) ($\alpha=0.05$) were calculated using the R package ‘Agricolae’ version 1.3-3 (Mendiburu, 2020). Data were analyzed with the ‘aov’ function (R Core Team, 2019).

Pathogen pressure was high due to optimal conditions and supplemental irrigation during anthesis. This allowed sufficient differences in disease severity to determine differences between treatments. The untreated check had a disease severity (AUDPS) of 401.5, which was not significantly different than Topguard EQ, Lucento, and the experimental treatment. Prosaro and Caramba both had a significantly lower AUDPS than the untreated check. The best results were from the Miravis Ace treatment and the healthy check, which was multiple treatments of Miravis Ace. While there were multiple effective fungicide treatments for FHB, Miravis Ace performed significantly better than all other treatments at decreasing the AUDPS.

Fungicide and rate (fl oz/A)	Plot Damage Severity (%)							AUDPS ^y	Yield (bu/A)	
	21-Jun	24-Jun	27-Jun	29-Jun	31-Jun	02-Jul	04-Jul			
Healthy Check ^z	0.4	0.7	1.7	2.8	4.9	6.1	8.3	50.8	a	62.56
Miravis Ace; 13.7 oz	0.2	1.2	1.2	2.5	8.6	9.4	9.1	65.9	a	63.414
Prosaro 421 SC; 8.2 oz	0.2	0.5	3.0	4.3	18.9	22.1	37.6	173.9	b	48.692
Caramba 0.75 SL; 14 oz	0.4	0.8	3.9	6.3	25.6	32.2	34.6	208.9	b	44.584
Topguard EQ; 5 oz	0.4	1.8	6.2	9.6	32.1	50.6	58.4	320.3	c	43.934
Lucento; 5 oz	0.6	1.5	7.1	21.2	32.1	56.3	73.0	386.0	c	36.926
Untreated Check	0.8	1.7	5.2	22.2	42.2	52.5	74.9	401.5	c	35.114
Experimental	0.8	3.0	8.8	22.0	48.5	52.1	64.3	403.1	c	34.41
<i>P</i> value	0.15	0.0396	0.0009	0.0022	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001
CV	85.8	82.68	57.02	84.1	35.09	29.88	39.24	28.49		13.03
LSD ^x (<i>P</i> = 0.05)	--	1.51	3.44	12.39	12.09	13.61	22.89	6.58		7.8

^zSprayed on 01 May, 06 May, 09 May, 27 May 2020, with Miravis Ace 13.7 oz/ac.

^yArea Under the Disease Progress Stairs as calculated by 7 ratings at 19, 22, 25, 27, 29, 31, and 33 days after heading, on 02 May.

^xData were analyzed with R Core Team (2019). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>. Least significant difference (LSD) at *P* = 0.05 were calculated using the Agricolae package.