

Management of Fusarium Head Blight of Wheat: Are Premium Fungicides Needed on Resistant Varieties?

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OBJECTIVE

The primary objective of this research was to evaluate different fungicide products for Fusarium head blight (FHB) management across different wheat varieties.

METHODS & MATERIALS

A field trial was conducted at the University of Kentucky Research and Education Center (UKREC) in Princeton, KY to evaluate the effect of different foliar fungicide treatments across different wheat varieties for management of FHB. On October 28, 2022, 6 different wheat varieties ('AgriMaxx 513', 'Croplan 9415', 'Dynagro 9172', 'Pembroke 21', 'Pioneer 26R59', and 'Pioneer 26R36' were planted at approximately 1.5 million seeds/A. Each plot was 5 ft wide (8 rows spaced 7.5 inches apart) and 16 ft long. Plots were planted no-till into corn stubble and were arranged in a randomized complete block design with 3 replications (blocks). Across each wheat variety, the following treatments were applied at Feekes growth stage 10.51 (anthesis), which occurred between May 1-4, 2023. The fungicide treatments included a non-treated control; Folicur (tebuconazole) at 4 fl oz/A; Miravis Ace (pydiflumetofen + propiconazole) at 13.7 fl oz/A; Caramba (metconazole) at 13.5 fl oz/A; Prosaro (prothioconazole + tebuconazole) at 6.5 fl oz/A; Prosaro Pro (prothioconazole + tebuconazole + fluopyram) at 10.3 fl oz/A; Sphaerex (metconazole + prothioconazole) at 7.3 fl oz/A; and Double Nickel LC (*Bacillus amyloliquefaciens* strain D747) at 192 fl oz/A. All treatments were applied with a backpack sprayer equipped with Twinjet 60 8002 nozzles calibrated to deliver 20 gal/A. To help ensure FHB disease pressure, plots were mist-irrigated 3 times daily for a duration of 15 minutes each from the boot stage through soft dough stage, and plots were inoculated with a spore suspension of *Fusarium graminearum* (20,000 spores/ml) the day following fungicide application. Plots were rated for FHB incidence and severity on May 26, 2023, and those data were used to calculate a FHB severity index score (0-100 scale) that were statistically analyzed. Yield, grain moisture, and test weight were obtained at harvest. Data were statistically analyzed using the General Linear Models procedure using SAS software (version 9.4). When treatments were found to be statistically significant ($P \leq 0.05$), means were compared for differences using Fisher's least significant difference (LSD) test with an alpha = 0.05. University of Kentucky Cooperative Extension recommendations were followed for nutrient and weed management.

RESULTS AND DISCUSSION

Fusarium head blight pressure was low in the trial, with the FHB severity index in the nontreated controls in the different wheat varieties ranging from 1.9 to 5.9, with the lowest FHB severity index being observed in 'Pioneer 26R36' and greatest in 'Croplan 9415' (Table 1). The effect of fungicides on FHB severity index varied across varieties.

Compared to the nontreated control, fungicide treatments significantly ($P \leq 0.05$) reduced FHB severity index per the following for the different varieties: 4 of 6 varieties for Folicur, Miravis Ace, Caramba, and Prosaro, and Sphaerex, 3 of 6 varieties for Prosaro Pro, and 0 of 6 varieties for Double Nickel. Grain moisture was significantly increased with Folicur, Prosaro, and Sphaerex for 1 of 6 varieties, with Miravis Ace for 5 of 6 varieties, and 0 of 6 varieties for the other fungicides. A significant increase in yield relative to the nontreated control was not observed for any of the fungicides. A significant increase in test weight relative to the nontreated control was observed with Folicur, Caramba, Prosaro Pro, Sphaerex, and Double Nickel for 1 of 6 varieties, with Prosaro in 2 of 6 varieties, and with Miravis Ace in 3 of 6 varieties. A significant decrease in DON relative to the nontreated control was observed with Prosaro and Prosaro Pro in 1 of 6 varieties, with Caramba and Sphaerex in 2 of 6 varieties, with Miravis Ace in 3 of 6 varieties, and in 0 of 6 varieties for the other fungicides.

In general, the “premium” fungicides provided more consistent management of FHB and DON than the Folicur treatment. Since FHB pressure was generally low, yields were not impacted by fungicide treatments. An economic analysis will be conducted, which will provide greater insight on the performance of each treatment.

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Table 1. Effect of different fungicide treatments applied at Feekes 10.51 on Fusarium head blight (FHB) severity index, grain moisture, test weight, yield, and DON on six different wheat varieties at Princeton, KY in 2023.

Variety	Treatment	Rate (fl oz/A)	FHB severity index (0-100)	Grain moisture (%)	Test weight (lb/bu)	Yield (bu/A)	DON (PPM)
AgriMaxx 513	Nontreated	.	4.3	16.1	54.4	58.3	0.7
	Folicur	4	1.7	16.0	54.4	58.2	0.8
	Miravis Ace	13.7	0.8	16.6	56.3	73.9	0.2
	Caramba	13.5	1.4	16.0	54.3	70.1	0.5
	Prosaro	6.5	0.9	16.1	54.8	62.3	0.3
	Prosaro Pro	10.3	2.4	16.1	55.1	62.7	0.6
	Sphaerex	7.3	2.1	15.9	54.3	68.2	0.3
	D. Nickel	192	3.2	16.0	54.6	63.2	1.1
Croplan 9415	Nontreated	.	5.9	15.8	54.3	53.3	1.7
	Folicur	4	3.5	16.1	54.8	66.7	1.2
	Miravis Ace	13.7	1.6	16.0	55.3	58.1	1.1
	Caramba	13.5	1.1	15.8	54.7	65.2	0.8
	Prosaro	6.5	2.0	16.1	54.7	65.9	1.0
	Prosaro Pro	10.3	3.0	16.0	55.1	70.7	1.0
	Sphaerex	7.3	1.9	16.1	54.4	58.2	0.5
	D. Nickel	192	6.1	15.8	54.7	68.6	1.9
Dynagro 9172	Nontreated	.	2.1	16.1	53.0	48.5	0.7
	Folicur	4	1.6	16.1	54.2	55.0	0.8
	Miravis Ace	13.7	0.5	16.6	55.7	64.3	0.3
	Caramba	13.5	1.7	16.2	53.7	58.0	0.8
	Prosaro	6.5	0.9	16.1	54.4	67.7	1.0
	Prosaro Pro	10.3	1.1	16.2	53.8	66.7	0.7
	Sphaerex	7.3	1.1	16.1	54.1	70.2	0.6
	D. Nickel	192	2.9	16.1	54.1	60.7	1.0
Pembroke 21	Nontreated	.	4.6	16.2	53.7	51.0	0.7
	Folicur	4	2.3	16.2	55.8	59.6	0.7
	Miravis Ace	13.7	2.1	16.5	56.4	63.4	0.3
	Caramba	13.5	1.5	16.1	55.3	53.0	0.6
	Prosaro	6.5	1.1	16.1	55.4	61.3	0.4
	Prosaro Pro	10.3	1.2	16.2	55.9	57.3	0.4
	Sphaerex	7.3	1.9	16.1	55.5	55.2	0.5
	D. Nickel	192	3.1	16.2	55.1	63.0	1.1
Pioneer 26R36	Nontreated	.	1.9	16.2	55.8	53.2	1.0
	Folicur	4	1.5	16.2	55.8	57.1	0.7
	Miravis Ace	13.7	0.3	16.6	56.1	49.9	0.4
	Caramba	13.5	1.9	16.1	56.1	63.7	0.6
	Prosaro	6.5	1.9	16.1	55.7	61.5	0.6
	Prosaro Pro	10.3	1.6	16.2	55.7	54.4	0.6
	Sphaerex	7.3	0.9	16.0	55.8	62.5	0.5
	D. Nickel	192	2.1	16.0	56.0	60.8	0.8
Pioneer 26R59	Nontreated	.	4.9	16.6	53.8	45.9	1.1
	Folicur	4	2.6	16.7	54.3	65.4	1.1
	Miravis Ace	13.7	0.4	17.2	55.4	58.9	0.4
	Caramba	13.5	1.4	16.4	53.9	59.5	0.5
	Prosaro	6.5	1.6	16.5	54.1	64.4	0.8
	Prosaro Pro	10.3	1.4	16.7	54.0	50.5	0.7
	Sphaerex	7.3	2.1	16.7	53.7	53.2	0.5
	D. Nickel	192	3.8	16.5	53.6	55.5	1.6
		<i>P</i> > <i>F</i>	0.0001	0.0001	0.0001	0.7611	0.0001
		LSD0.05	2.0	0.3	1.3	NS	0.6
		CV (%)	57.9	1.0	1.5	22.0	46.3

