EVALUATION OF FOLIAR FUNGICIDES FOR FUSARIUM HEAD BLIGHT MANAGEMENT ACROSS DIFFERENT WHEAT VARIETIES

Carl A. Bradley, Kelsey Mehl, John Walsh, and Nathan White
Department of Plant Pathology, University of Kentucky, Princeton, KY 42445

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 19, 2021, 6 different wheat varieties ('AgriMaxx 513', 'Croplan 9415', 'Dynagro 9941', 'Pembroke 21', 'Pioneer 26R59', and 'Pioneer 26R36' were planted at approximately 1.5 million seeds/A. Each plot was 49 inches wide (7 rows spaced 7 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 7-10, 2022. 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 19, 2022, 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 moderate in the trial, with the FHB severity index in the nontreated controls in the different wheat varieties ranging from 2.4 to 8.3, with the lowest FHB severity index being observed in 'Dynagro 9941' and greatest in 'Pembroke 21' (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 an, Caramba, and Prosaro Pro, 3 of 6 varieties for Miravis Ace and Prosaro Pro, 2 of 6 varieties for Sphaerex, and 1 of 6 varieties for Double Nickel. Grain moisture generally was not affected by most fungicides but was significantly increased with Miravis Ace in 5 of 6 varieties, relative to the nontreated control. A significant increase in test weight, relative to the nontreated control, was observed as follows: 1 of 6 varieties for Folicur, Caramba, and Sphaerex, 2 of 6 varieties for Miravis Ace and Prosaro, 3 of 6 varieties for Prosaro Pro, and in 0 of 6 varieties for Double Nickel. A significant increase in yield, relative to the nontreated control, was observed as follows: 1 of 6 varieties for Folicur, Caramba, Prosaro, Prosaro Pro, Sphaerex, and Double Nickel, and 3 of 6 varieties for Miravis Ace.

Many of the varieties in this trial are considered to be moderately resistant to FHB. Thus, it is not surprising that minimal effects of fungicides were observed on several varieties. On the two varieties in which FHB was most severe, 'Pembroke 21' and 'Pioneer 26R36', the effects of the fungicide treatments on FHB severity index was more consistent, with almost every treatment significantly reducing FHB severity index values compared to the nontreated

controls (Table 1). The level of FHB severity index observed in 'Pioneer 26R36' likely had an effect on yield response with fungicides, as every treatment significantly increased yield compared to the nontreated control.

In general, fungicides had the greatest and most consistent impacts on varieties that were observed to be more susceptible to Fusarium head blight. This study needs to be conducted over at least one more year to determine if results are consistent over different growing seasons. In addition, DON data from grain samples collected at harvest from this trial were not yet available when this report was written. Since DON contamination of grain is a serious issue, when available, these data will help provide a greater picture of the effect of the fungicide treatments across varieties.

ACKNOWLEDGEMENTS

Support for this research came from the Kentucky Small Grain Growers Association.

Table 1. Effect of different fungicide treatments applied at Feekes 10.51 on Fusarium head blight (FHB) severity index, grain moisture, test weight, and yield on six different wheat varieties at Princeton, KY in 2022

Variety	Treatment	Rate (fl oz/A)	FHB severity index (0-100)	Grain moisture (%)	Test weight (lb/bu)	Yield (bu/A)
AgriMaxx 513	Nontreated	.	3.3	13.6	59.9	73.9
	Folicur	4	0.5	13.7	59.8	74.7
	Miravis Ace	13.7	1.1	14.0	60.8	79.4
	Caramba	13.5	0.7	13.5	59.0	67.2
	Prosaro	6.5	1.9	13.7	60.0	68.4
	Prosaro Pro	10.3	0.3	13.8	61.0	80.7
	Sphaerex	7.3	1.3	13.6	59.6	74.7
	D. Nickel	192	1.2	13.7	59.3	71.4
Croplan 9415	Nontreated	.	3.9	12.8	57.9	65.0
	Folicur	4	2.3	13.2	58.8	74.0
	Miravis Ace	13.7	0.8	14.0	58.8	80.6
	Caramba	13.5	0.7	13.4	60.3	71.6
	Prosaro	6.5	0.3	13.3	59.6	72.1
	Prosaro Pro	10.3	0.7	13.6	60.7	73.8
	Sphaerex	7.3	1.7	13.2	58.8	68.5
	D. Nickel	192	5.4	12.8	57.8	64.9

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Table 1 (continued)

Variety	Treatment	Rate (fl oz/A)	FHB severity index (0-100)	Grain moisture (%)	Test weight (lb/bu)	Yield (bu/A)
Dynagro 9941	Nontreated	.	2.4	12.7	57.0	73.2
	Folicur	4	1.3	12.9	57.5	75.0
	Miravis Ace	13.7	0.9	13.2	58.4	80.1
	Caramba	13.5	0.3	12.8	56.6	72.6
	Prosaro	6.5	0.6	12.9	57.7	79.7
	Prosaro Pro	10.3	0.5	12.9	57.9	68.6
	Sphaerex	7.3	1.9	12.7	57.5	71.9
	D. Nickel	192	2.2	12.1	55.5	72.7
Pembroke 21	Nontreated	.	8.3	12.9	57.0	56.7
	Folicur	4	3.1	13.3	59.1	54.7
	Miravis Ace	13.7	2.2	13.5	59.8	66.6
	Caramba	13.5	4.3	13.0	57.7	60.5
	Prosaro	6.5	3.1	13.1	58.7	65.0
	Prosaro Pro	10.3	3.9	13.5	58.9	64.7
	Sphaerex	7.3	2.3	13.3	58.7	61.5
	D. Nickel	192	7.5	13.0	57.6	58.1
Pioneer 26R36	Nontreated	.	5.7	14.0	60.6	62.2
	Folicur	4	2	14.0	60.6	73.1
	Miravis Ace	13.7	0.9	14.5	61.5	73.3
	Caramba	13.5	1.3	14.1	60.6	72.4
	Prosaro	6.5	0.1	14.0	60.6	72.1
	Prosaro Pro	10.3	1.4	14.0	60.8	75.9
	Sphaerex	7.3	1.1	14.1	61.1	71.8
	D. Nickel	192	0.9	13.8	60.8	72.3
Pioneer 26R59	Nontreated	.	3.7	13.2	57.3	68.9
	Folicur	4	0.9	13.4	58.3	71.0
	Miravis Ace	13.7	2.7	13.9	59.1	67.6
	Caramba	13.5	1.3	13.3	58.5	73.5
	Prosaro	6.5	1.8	13.3	57.6	70.9
	Prosaro Pro	10.3	1.5	13.6	59.0	73.4
	Sphaerex	7.3	2.1	13.1	57.2	66.3
	D. Nickel	192	2.8	13.0	57.2	59.8
		P > F	0.0001	0.0001	0.0001	0.0001
		LSD 0.05	2.8	0.5	1.5	9.4
		CV (%)	82.8	2.2	1.5	8.3