

MANAGEMENT OF FUSARIUM HEAD BLIGHT OF WHEAT WITH FUNGICIDES AND VARIETIES

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INTRODUCTION (objective)

Fusarium head blight (FHB) (caused by *Fusarium graminearum*) is one of the most destructive diseases of wheat in Kentucky. The objective of this research was to evaluate different fungicide products for 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 10, 2023, five different wheat varieties ('AgriMaxx 513', '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 15 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 on April 22, 2024. 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* (40,000 spores/ml) the day following fungicide application. 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 & DISCUSSION

In addition to the mist-irrigation that was applied just prior to heading and through grain fill, frequent rainfall occurred beginning approximately 10 days after beginning anthesis (Feekes growth stage 10.51). This rainfall allowed for late infections of the Fusarium head blight fungus, which resulted in relatively high deoxynivalenol (DON) values in the grain collected at harvest. When comparing the non-treated control

treatments for each variety, DON values ranged from 2.8 to 5.2 ppm, where ‘Pioneer 26R36’ and ‘Pioneer 26R59’ had the greatest DON values, which were not significantly different than ‘Dynagro 9172’ (Table 1). ‘Pembroke 21’ and ‘AgriMaxx 513’ had the lowest DON values, which were not significantly different than ‘Dynagro 9172’. Within each variety, the effect of specific fungicides on reducing DON values differed. Within ‘AgriMaxx 513’, Miravis Ace, Caramba, and Sphaerex all significantly reduced DON values compared to the non-treated control. Within ‘Dynagro 9172’, Miravis Ace and Caramba significantly reduced DON values compared to the non-treated control. Within ‘Pembroke 21’, only Prosaro Pro significantly reduced DON values compared to the non-treated control. Within ‘Pioneer 26R36’, all treatments, except Folicur, significantly reduced DON values compared to the non-treated control. Within ‘Pioneer 26R59’, Miravis Ace, Caramba, Prosaro, and Prosaro Pro significantly reduced DON compared to the non-treated control.

Compared to the non-treated control, grain moisture was significantly increased with Miravis Ace in 2 varieties, with Sphaerex in 1 variety, and with Prosaro in 1 variety. A significant increase in test weight relative to the non-treated control was observed with Folicur in 1 variety, Miravis Ace in 5 varieties, with Caramba in 2 varieties, with Prosaro in 3 varieties, with Prosaro Pro in 4 varieties, with Sphaerex in 1 variety, and with Double Nickel in 1 variety. Within varieties, the only increase in protein relative to the non-treated control occurred when Double Nickel LC was applied to ‘AgriMaxx 513’. Only Miravis Ace provided a significant increase in yield relative to the non-treated control, which was observed in 3 varieties.

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TABLES

Table 1. Effect of different fungicide treatments applied at feekes growth stage 10.51 on grain moisture, test weight, yield, protein, and deoxynivalenol (don) on five different wheat varieties at Princeton, KY in 2024.

_Variety	Treatment	Rate (fl oz/A)	Grain moisture (%)	Test weight (lb/bu)	Yield (bu/A)	Protein (%)	DON (PPM)
AgriMaxx 513	Nontreated	.	18.9	48.6	59.5	13.3	2.9
	Folicur	4	19.1	50.3	64.3	13.6	2.0
	Miravis Ace	13.7	19.1	51.6	73.4	13.6	1.3
	Caramba	13.5	18.9	51.0	60.3	13.7	1.3
	Prosaro	6.5	19.0	50.9	47.1	13.4	1.9
	Prosaro Pro	10.3	19.0	50.9	62.1	13.6	1.9
	Sphaerex	7.3	18.8	50.9	57.2	13.8	1.1
	D. Nickel	192	18.7	49.6	63.4	13.9	2.7

(Table 1 continued on next page)

Variety	Treatment	Rate (fl oz/A)	Grain moisture (%)	Test weight (lb/bu)	Yield (bu/A)	Protein (%)	DON (PPM)
Dynagro 9172	Nontreated	.	18.6	48.8	54.2	13.0	4.0
	Folicur	4	18.6	49.2	63.0	13.1	4.2
	Miravis Ace	13.7	19.6	50.9	75.4	12.8	2.7
	Caramba	13.5	18.6	49.4	57.5	12.8	2.6
	Prosaro	6.5	18.8	49.4	52.7	13.4	3.0
	Prosaro Pro	10.3	18.8	50.1	63.0	13.2	3.1
	Sphaerex	7.3	19.1	49.6	60.2	13.0	3.0
	D. Nickel	192	18.8	47.5	52.5	13.0	3.3
Pembroke 21	Nontreated	.	19.2	50.9	55.4	13.6	2.8
	Folicur	4	19.1	51.0	62.5	13.0	1.9
	Miravis Ace	13.7	19.5	52.4	67.4	13.5	1.7
	Caramba	13.5	19.2	51.4	61.2	13.0	1.8
	Prosaro	6.5	19.2	52.5	61.6	13.3	1.7
	Prosaro Pro	10.3	19.2	52.3	62.2	13.4	1.4
	Sphaerex	7.3	19.2	52.0	56.8	13.7	1.6
	D. Nickel	192	19.0	51.3	53.8	13.9	2.2
Pioneer 26R36	Nontreated	.	18.7	51.5	67.5	13.3	5.2
	Folicur	4	18.7	50.8	75.1	12.9	4.6
	Miravis Ace	13.7	19.0	52.9	75.4	13.2	1.5
	Caramba	13.5	18.6	51.7	68.0	12.9	2.6
	Prosaro	6.5	18.3	51.8	66.9	13.7	2.7
	Prosaro Pro	10.3	18.6	52.0	73.3	13.0	2.8
	Sphaerex	7.3	18.3	52.1	63.9	13.6	2.1
	D. Nickel	192	18.7	51.0	67.7	13.1	3.2
Pioneer 26R59	Nontreated	.	18.9	46.8	56.0	13.1	4.2
	Folicur	4	19.2	46.6	56.7	12.8	3.4
	Miravis Ace	13.7	19.7	49.5	62.5	13.0	2.6
	Caramba	13.5	19.1	48.1	58.4	12.9	2.7
	Prosaro	6.5	19.4	48.3	53.6	13.0	2.4
	Prosaro Pro	10.3	19.1	48.8	57.9	13.4	2.5
	Sphaerex	7.3	19.2	47.8	59.4	13.0	2.9
	D. Nickel	192	18.9	46.6	59.5	13.1	4.3
		LSD 0.05*	0.5	1.2	9.4	0.6	1.3

*Fisher's least significant difference with alpha = 0.05.