

EFFECT OF FUNGICIDE X WHEAT VARIETY ON FUSARIUM HEAD BLIGHT, DEOXYNIVALENOL CONTAMINATION, AND YIELD

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OBJECTIVE

The objective of this research was to evaluate different fungicide products for management of Fusarium head blight (FHB) and the associated mycotoxin Deoxynivalenol (DON) and their impact on wheat yield.

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 three different wheat varieties for management of FHB and DON, and for their effects on wheat yield. On October 29, 2022, three different wheat varieties ('AgriMaxx 463', 'Pembroke 21', and 'Pioneer 26R59') were planted at approximately 1.5 million seeds/A. Each plot was 60 inches 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 split-plot design with wheat variety being the main plot and fungicide being the subplot. Every treatment was replicated 4 times in different blocks. Treatments included a non-treated control, Miravis Ace (pydiflumetofen + propiconazole) at 13.7 fl oz/A, Prosaro (prothioconazole + tebuconazole) at 6.5 fl oz/A, Prosaro Pro (prothioconazole + tebuconazole + fluopyram) at 10.3 fl oz/A, and Sphaerex (metconazole + prothioconazole) at 7.3 fl oz/A. All treatments were applied with a backpack sprayer equipped with Twinjet 60 8002 nozzles calibrated to deliver 20 gal/A. All plots were inoculated with a suspension of *Fusarium graminearum* spores (60,000 spores/ml) on May 6, 2023. Plots were rated for FHB incidence and severity on May 25, 2023, and those data were used to calculate an FHB severity index score (0-100 scale) that were statistically analyzed. Weight of harvested grain and moisture were obtained at harvest and were used to calculate yields on a bushel per acre basis using a standard grain moisture of 13.5%. Grain samples from each plot were collected at harvest and sent to the University of Minnesota DON Testing Laboratory (St. Paul, MN) to analyze samples for DON contamination. Data were statistically analyzed 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 (FHB) pressure was moderately low in the trial, with the FHB severity index in the non-treated/inoculated controls in the different wheat varieties ranging from 5.5 to 8.3, with the lowest FHB severiting being observed in 'AgriMaxx 463' and greatest in 'Pioneer 26R59' (Table 1). Within each variety, all treatments significantly reduced the FHB index relative to respective non-treated control for each variety. In general, DON contamination was relatively low and stayed below the 2 ppm dockage threshold, except in the non-treated control treatment for 'Pioneer 26R59'. Within each variety, all treatments significantly reduced DON relative to the respective non-treated control for each variety, except for Sphaerex fungicide applied to 'Pembroke 21', which had a DON value that was not significantly different

than the non-treated control for that variety. Statistically significant differences in yields occurred among varieties, but within varieties, significant differences were not detected across treatments.

The lowest FHB severity index and DON values were achieved when the most resistant varieties were applied with an efficacious fungicide treatment. This is similar to past field research trials that have documented that the integrated management effects of variety resistance and fungicides are the best way to manage FHB and DON. In general, all fungicide products tested resulted in similar management of FHB and DON. Although supply demands can affect the availability of products within different regions, farmers should be able to have access to at least one of the products tested in this research, which should have good efficacy against FHB and DON, based on our research.

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TABLES

Table 1. Effect of different fungicide treatments applied at Feekes 10.51 on Fusarium head blight (FHB) severity index, deoxynivalenol (DON) contamination, and yield on three different wheat varieties at Princeton, KY in 2023.

Variety	Treatment	Rate (fl oz/A)	FHB severity index (0-100)	DON (ppm)	Yield (bu/A)
AgriMaxx 463	Non-treated	.	5.5	1.7	88.2
	Miravis Ace	13.7	1.5	0.9	98.5
	Prosaro	6.5	2.4	0.7	93.0
	Prosaro Pro	10.3	2.4	0.6	95.8
	Sphaerex	7.3	2.9	1.0	90.2
Pembroke 21	Non-treated	.	8.3	1.2	90.5
	Miravis Ace	13.7	1.9	0.7	95.3
	Prosaro	6.5	4.0	0.5	94.2
	Prosaro Pro	10.3	1.8	0.7	91.9
	Sphaerex	7.3	3.5	0.8	92.4
Pioneer 26R59	Non-treated	.	8.4	2.4	97.1
	Miravis Ace	13.7	2.0	0.7	105.6
	Prosaro	6.5	4.0	0.7	107.5
	Prosaro Pro	10.3	2.7	1.0	106.7
	Sphaerex	7.3	3.7	0.9	104.4
<i>P > F</i>			0.0001	0.0001	0.0436
LSD 0.05			1.9	0.5	14.0