

Efficacy of Fungicides at Different Application Timings to Manage Fusarium Head Blight in Hard Red Spring Wheat

Venkat Chapara, Amanda Arens and Andrew Friskop

Objective: To evaluate the efficacy of fungicides at different application timings to manage Fusarium head blight (FHB) in Hard Red Spring Wheat (HRSW).

Methods:

Location: NDSU Langdon Research Extension Center

Experimental design: Randomized complete block, replicated four times.

Previous crop: Canola

Cultivars of HRSW tested: WB Mayville

Planting: 1.5 million pure live seeds/acre planted on May 26, 2022. A border plot was planted between treated plots to minimize interference from spray drift.

Plot size: Seven rows at six inch spacing, 5 ft. x 20 ft., mowed back to 5 ft. x 16 ft.

Herbicides applied: Wide Match (1.33 pt/a) + Axial Bold (15 fl oz/a) + 2, 4-D Amine (1 pt/a) applied on June 17, 2022.

Inoculation: Plots were inoculated by spreading corn spawn inoculum at the approximate boot stage (Feekes 9-10) at the rate of 300 g/plot.

Disease development: Supplemental moisture was provided by running overhead irrigation from boot to soft dough stage at the rate of one hour per day to create a conducive environment for FHB development.

Fungicide treatments: Fungicides were applied with a CO₂-pressurized backpack sprayer with a three nozzle boom (XR-8002) and water volume at 20 GPA. Fungicides Prosaro, Caramba, Miravis Ace, Prosaro Pro, and Sphaerex were applied at 10% flowering (anthesis or 10.5.1 stage) on July 15 and five days after anthesis sprays were completed on July 20. Refer to Table 1 for the treatments, rates and application timings.

Disease assessment: FHB incidence was obtained on fifty random heads showing FHB symptoms at hard dough stage (8/5/2022). FHB head severity was rated using 0 -100% scale on fifty random heads, excluding two outer rows. FHB index (Index) was calculated using formula: Index = (SEV*INC)/100.

Harvest: Plots were harvested on September 15 with a small plot combine and the yield was determined at 13.5% moisture.

Data analysis: Statistical analysis was done using Agrobases Generation II software. Fisher's least significant difference (LSD) was used to compare means at p ($\alpha = 0.05$).

Results: There were significant differences found between the non-treated check and the fungicide treatments that were applied at different timings among the variables tested. Moreover, there were significant differences found among the application timings in the yield obtained among the fungicide treatments. Treatments that received sprays at the crop stage of early anthesis and four to six days after early anthesis had higher yields in comparison to that of non-treated check and fungicides applied only at early anthesis (Feekes 10.5.1) (Table 1).

Table 1: Efficacy of fungicides at various application timings to manage Fusarium Head Blight on Hard Red Spring Wheat.

Treatments	Application Details		FHB			DON (ppm)	Yield (bu/A)	Test Wt. (lbs/bu)
	Timing	Rate (Fl. Oz/A)	Incidence %	Severity %	Index			
Non-treated Check	Check	...	42	11.5	5.32	2.85	57	56
Prosaro	Feekes 10.5.1 (early anthesis)	6.5	10	2.0	0.23	1.5	59	57
Caramba	Feekes 10.5.1 (early anthesis)	13.5	6	1.7	0.09	1.18	60	57
Miravis Ace	Feekes 10.5.1 (early anthesis)	13.7	6	0.8	0.04	0.9	66	58
Prosaro Pro	Feekes 10.5.1 (early anthesis)	10.3	6	1.6	0.16	0.98	63	58
Sphaerex	Feekes 10.5.1 (early anthesis)	7.3	9	1.3	0.16	0.93	60	57
Miravis Ace fb Prosaro Pro	Early anthesis fb 4-6 days after early anthesis	13.7/10.3	3	0.4	0.01	0.2	68	59
Miravis Ace fb Sphaerex	Early anthesis fb 4-6 days after early anthesis	13.7/7.3	2	0.5	0.03	0.25	70	59
Miravis Ace fb Tebuconazole	Early anthesis fb 4-6 days after early anthesis	13.7/4	6	0.8	0.05	0.68	68	59
Sphaerex	4-6 days after early anthesis	7.3	11	1.9	0.23	0.43	72	59
	Mean		10	2	0.63	0.99	64	58
	LSD		10	3	1.7	0.95	6	2
	P-Value (0.05)		0.00001*	0.0001*	0.0001*	0.0002*	0.0001*	0.003*
**fb: followed by								

* Indicates treatments are statistically significant.

Note: All treatments were applied with non-ionic surfactant (NIS) @ 0.125 v/v.

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