

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

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

Location: NDSU Langdon Research Extension Center

Experimental design: Randomized complete block, replicated four times.

Previous crop: Canola

Cultivar of HRSW tested: WB Mayville

Planting: 1.5 million pure live seeds/acre planted on May 22, 2023. 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: Pre-emergent Treflan @ 1.5pt/a was applied, incorporated and then planted. Post-emergent Huskie FX (18 oz/a) + Axial Bold (15 fl oz/a) was applied on June 8, 2023.

Inoculation: Plots were inoculated by spreading corn spawn inoculum at the approximate boot stage (Feekes 9-10) at the rate of 300 g/plot (6/29/2023).

Disease development: Supplemental moisture was provided by running overhead irrigation from boot to soft dough stage for 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 and their rate in fluid oz/a in parenthesis are as follows: Prosaro (6.5), Caramba (13.5), Miravis Ace (13.7), Prosaro Pro (10.3), Sphaerex (7.3), Teagro (5.2), and Tebuconazole (4). These fungicides were applied at 10% flowering (anthesis or 10.5.1 stage) on July 15. Likewise, five days after anthesis (July 20), sprays were completed in those treatments as required in the protocol. Refer to Table 1 for the treatments and application timings.

Disease assessment: FHB incidence was obtained on fifty random heads showing FHB symptoms at hard dough stage (8/7/2023). 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 7 with a small plot combine and the yield was determined at 13.5% moisture.

Data analysis: Statistical analysis was done using Agrobase 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. Among the fungicides tested there were no significant difference observed except for Taegro. The performance of Taegro when applied at 10% flowering was similar to non-treated check in the variables tested except yield. There were no significant differences found among the application timings in the yield obtained among the fungicide

treatments. There were significant differences found among the treatments in terms of test weight (Table 1).

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

Treatments	Fusarium Head Blight				Yield	Test weight
	% Incidence	% Severity	INDEX	DON	bu/A	lbs/bu
Non-Treated Check	29	12	3.67	2.6	57	56.4
Prosaro	8	7	0.49	0.9	67	57.8
Caramba	7	4	0.36	0.8	57	57.4
Miravis Ace	6	5	0.32	1.6	62	58.1
Prosaro Pro	7	5	0.46	0.4	57	58.6
Sphaerex	5	6	0.45	0.9	59	57.6
Miravis Ace fb** Prosaro Pro	3	3	0.13	0.3	61	58.9
Miravis Ace fb** Sphaerex	2	1	0.05	0.5	62	57.9
Miravis Ace fb** Tebuconazole	3	2	0.06	1.0	65	58.2
SphaerexLATE	9	8	1.13	0.3	72	57.6
Taegro	29	9	3.00	2.6	66	56.8
Taegro+Tebuconazole	11	6	0.60	1.7	54	57.5
Tebuconazole	14	11	1.46	2	63	56.9
Mean	10.0	6	0.94	1.9	61.7	58
CV%	82.5	60	118.0	68.0	16.7	1.4
LSD	11.9	5	1.6	1.2	NS	1.1
P-Value (0.05)	0.0002*	0.0022*	0.0003*	0.0005*	NS	0.0038*

* Indicates treatments are statistically significant.

fb**: The first spray is followed after 4-5 days of anthesis

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

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