Efficacy of Fungicides to Fusarium Head Blight in Spring Wheat

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A field study was planted on May 22, 2023 at the NDSU Langdon Research Extension Center. The experimental design was laid out as a randomized complete block with four replications. Plots were seven rows spaced at six-inch row spacing with a row length of 20 feet trimmed to 15 feet for harvest. The variety 'WB Mayville' HRSW was seeded at a rate of 1.2 million pure live seeds/a. An untreated border plot was planted between treated plots to minimize interference from spray drift. The previous crop was canola. Pre-emergent herbicide Treflan @ 1.5 pt/a was applied on May 22, incorporated, and the trial was planted. Post-emergent herbicide Huskie FX (18 oz/a) + Axial Bold (15 fl oz/a) was applied on June 8, 2023.

The plots were inoculated by spreading corn spawn inoculum at boot stage (Feekes 9-10) at a rate of 300 g/plot. Supplemental moisture was provided by running overhead irrigation from Feekes 10.5 to 11.25 for one hour per day to provide a conducive environment for Fusarium Head Blight (FHB) development. Fungicides were applied with a CO_2 backpack sprayer equipped with a three-nozzle boom (XR8001) operated at 40 psi delivering a water volume of 15 GPA. Fungicide application was made at Feekes 10.51 (10% flowering) on July 6 (wind speed 12 MPH, 60^{O} F at 1:45pm).

Percent FHB incidence (INC) was calculated by counting the number of heads showing FHB symptoms out of 50 randomly selected heads, excluding the two outer rows in the plot. FHB severity (SEV) was rated using a 0-100% scale from those same heads. FHB index (FHBI) was calculated using the formula FHBI=(SEV*INC)/100. Plots were harvested on September 7 with a plot combine. Yield and test weight were determined. 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

All the fungicides evaluated were very effective in managing percent incidence, severity, INDEX, and DON of FHB when compared with the non-treated check. The lowest FHB incidence, severity and INDEX was observed in Prosaro Pro followed by Miravis Ace and Caramba when sprayed at four days after 10% flowering. The same results were observed with Miravis Ace sprayed twice, at 10% flowering and four days after 10% flowering.

The treatment Prosaro Pro had the highest yields while the lowest yield was in the untreated check.

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

Treatment	Rate (oz/A)	Stage of Application	Fusarium Head Blight		DON		Protein	Yield	Test Weight
			% Incidence	% Severity	INDEX	(ppm)		bu/a	lbs/bu
Non-treated	0	CHECK	26	13	3.49	0.75	15	58	58.2
Miravis Ace	13.7	10%	5	6	0.31	0.93	16	60	59.6
Prosaro Pro	13.6	10%	7	4	0.33	0.8	15	65	59.2
Caramba	15	10%	11	8	1.18	0.98	15	65	58.3
Miravis Ace	13.7	4 DA 10% F	2	1	0.02	0.73	16	69	60.0
Prosaro Pro	13.6	4 DA 10% F	2	1	0.05	0.23	15	73	59.3
Caramba	15	4 DA 10% F	4	2	0.01	0.88	15	68	58.3
Miravis Ace	13.7	10% & 4 DA 10% F	2	2	0.05	0.35	16	70	60.1
		Mean	**7**	**5**	**1**	0.7	15.3	**66**	**59.1**
		CV%	**77**	**59**	**135**	80	3.2	**9**	**0.9**
		LSD	**8**	**4**	**1**	0.8	0.2	**8**	**0.8**
		P-Value	**0.0001***	**0.0001***	**0.0003***	NS	NS	**0.0172***	**0.00001***

10%: 10% of Flowering stage

DA 10 % F: Days after 10% Flowering

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

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