Efficacy of Fungicides to Fusarium Head Blight in Spring Wheat

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A field study was planted on May 13, 2024 at the 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 9590' 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. No pre-emergent herbicide was applied. A post-emergent herbicide, Huskie FX (18 fl oz/a) + Axial Bold (15 fl oz/a) + Prowl (2.5 pt/a), was applied on June 7, 2024.

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 applications were made at Feekes 10.51 (10% flowering) on July 11 (wind speed 15 MPH, 84^{O} F at 1:00 pm).

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 5 with a plot combine. Yield and test weight were determined. Statistical analysis was done using Genovix Generation II software. Fisher's least significant difference (LSD) was used to compare means at p ($\alpha = 0.05$).

Results

Compared with the non-treated check, all the fungicides evaluated were effective in managing the percent incidence, severity, and index of Fusarium Head Blight (FHB). The lowest FHB incidence, severity, and index were observed in the treatment Miravis Ace fb Sphaerex, followed by the treatment of the 'experimental compound' when sprayed at the respective application stages (Table 1). All of the fungicide treatments were statistically significant compared to the non-treated check, validating the effectiveness of the treatments. The treatment 'experimental compound' led to the highest yields, underscoring its potential practical implications, while the lowest yield was recorded in the non-treated check (Table 1).

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			Yield	Test Weight
			% Incidence	% Severity	Index	bu/a	lbs/bu
Non-Treated Check	Check	Check	54	25	15	60	56
Prosaro	13.7	Feekes 10.5.1 (early anthesis)	7	6	0.4	75	57
Experimental	13.6	Feekes 10.5.1 (early anthesis)	3	3	0.2	84	58
Miravis Ace	15	Feekes 10.5.1 (early anthesis)	9	8	0.8	83	58
Prosaro Pro	13.7	Feekes 10.5.1 (early anthesis)	6	3	0.3	76	57
Sphaerex	13.6	Feekes 10.5.1 (early anthesis)	6	7	0.5	74	57
Miravis Ace fb Prosaro Pro	13.7+10.3	Early anthesis fb 4 days after	3	7	0.3	77	58
Miravis Ace fb Sphaerex	13.7+7.3	Early anthesis fb 4 days after	3	1	0.0	78	57
Miravis Ace fb Tebuconazole	13.7+4	Early anthesis fb 4 days after	5	4	0.2	81	58
Sphaerex LATE	7.3	4-5 days after early anthesis	3	6	0.2	83	58
		Mean	10	7	2	77	57
		CV %	108	72	187	11	2
		LSD	15	7	5	12	NS
		P-Value (0.05)	0.00001*	0.00001*	0.00001*	0.0225*	NS

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

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