Management of Fusarium Head Blight in Spring Wheat Cultivars with Fungicides

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Objective: To evaluate the efficacy of fungicides in single and sequential applications to manage Fusarium head blight (FHB) in hard red spring wheat (HRSW).

Methods:

Location: NDSU Langdon Research Extension Center.

Experimental Design: Randomized complete block with four replications.

Previous crop: Soybean

Cultivars of HRSW tested: WB Mayville and SY Ingmar

Planting: 1.2 million pure live seeds/A was planted on May 2, 2016. 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: Axial XL (16.4 Fl. oz/A) + Huskie (15 Fl. oz/A) + Prowl H_2O (36 Fl. oz/A)

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

Disease development: Supplemental moisture was provided by running overhead irrigation from Feekes 9 to 11.25 at the rate of one hour per day to create conducive environment for FHB development.

Fungicide treatments: Fungicides were applied, with CO_2-pressurized backpack sprayer with three nozzle boom (XR-8002) and the water volume used was 20 GPA. Fungicide application was made at Feekes 10.51(anthesis) on July 4 and repeated 4 days after the first spray (July 8, 2016).

Disease Assessment: FHB incidence was calculated by counting the number of heads showing FHB symptoms out of 50 heads that were rated for severity. FHB head severity was rated using 0-100% scale on arbitrary 50 heads, excluding two outer rows. FHB index (Index) was calculated using formula: Index = (SEV*INC)/100.

Harvest: Plots were harvested on August 24 with a small plot combine and the yield was determined.

Data Analysis: Statistical analysis was done using SAS. Fisher's least significant difference (LSD) was used to compare means at p ($\alpha = 0.05$). Actual means are presented in the table for simplicity of understanding.

Results:

Both the HRSW varieties had the lowest FHB incidence, severity, index, DON content, FDK, and yield when treated with the combination fungicide treatments applied at Feekes 10.51 and repeated 4 days after the first application (Table 1) followed by Prosaro alone and were significantly different from the untreated (inoculated and non-inoculated) checks.

Table 1: Fungicides tested alone and in combinations on two HRSW varieties at two application timings to manage Fusarium head blight and evaluation of their influence on yield and other grain characteristics: toxin (DON) content, FDK, and test weight.

HRSW		Dosage		Fusarium Head Blight			DON	FDK	Yield	Test Weight
Variety	Fungicide	Fl. oz/A	Application timing	Incidence (%)	Severity (%)	Index	(ppm)	(%)	(bu/A)	(lbs/bu)
WB Mayville	Untreated check (Inoculated)	…	…	54	21	11.5	6.2	10	24	55
WB Mayville	Prosaro	6.5	Anthesis	13	6	0.91	2.3	5	47	57
WB Mayville	Prosaro+Caramba	6.5 + 14	Anthesis+4 days after anthesis	7	3	0.91	1.3	1	58	58
WB Mayville	Caramba+Folicur B	14 + 4	Anthesis+4 days after anthesis	13	7	0.94	0.9	4	55	58
WB Mayville	Proline+Folicur B	5.7 + 4	Anthesis+4 days after anthesis	11	7	0.78	1.4	3	55	58
WB Mayville	Untreated check (non-inoculated)	…	…	56	20	11.4	6.5	12	30	55
SY Ingmar	Untreated check (Inoculated)	…	…	48	12	6.02	3.8	5	33	57
SY Ingmar	Prosaro	6.5	Anthesis	12	6	0.91	2.8	2	56	59
SY Ingmar	Prosaro+Caramba	6.5 + 14	Anthesis+4 days after anthesis	4	2	0.08	0.6	1	68	60
SY Ingmar	Caramba+Folicur B	14 + 4	Anthesis+4 days after anthesis	5	3	0.19	0.9	2	66	59
SY Ingmar	Proline+Folicur B	5.7 + 4	Anthesis+4 days after anthesis	7	2	0.77	0.8	1	67	60
SY Ingmar	Untreated check (non-inoculated)	…	…	46	10	4.5	5.8	5	38	57
			Mean	**23**	**8**	**50**	**2.8**	**4**	**50**	**58**
			CV %	**28**	**35**	**3.1**	**35**	**53**	**13**	**1**
			LSD (5%)	**9**	**4**	**2.3**	**1.4**	**3**	**9**	**1**

Note: Untreated check (non-inoculated) received no artificial inoculum

DON: Deoxynivalenol

FDK: Fusarium Damaged Kernels

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