

Management of Fusarium Head Blight in Spring Barley 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 barley.

Methods:

Location: NDSU Langdon Research Extension Center.

Experimental Design: Randomized complete block with four replications.

Previous crop: Soybean

Cultivars of barley tested: Tradition and Quest

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)

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 a conducive environment for FHB development.

Fungicide treatments: Fungicides were applied, with CO₂-pressurized backpack sprayer with a three nozzle boom (XR-8002) and the water volume used was 20 GPA. Fungicide application was made at Feekes 10.51(Full head emergence) on June 28 and 4 days after the first spray (July 3, 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: $\text{Index} = (\text{SEV} \times \text{INC}) / 100$.

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:

The barley variety “Tradition” had the lowest FHB incidence, severity, index, and DON content when treated with the combination of Prosaro + Caramba applied at Feekes 10.51 and repeated 4 days after the first application (Table 1). Likewise, the same treatment has higher yield, test weight and plump than the other fungicide treatments and was significantly different from both inoculated and non-inoculated checks. On the barley variety “Quest” the combination treatment of Prosaro + Caramba applied at Feekes 10.51 and repeated 4 days after the first application was significantly different in efficacy against the variables tested (Table 1) and were followed by other combination treatments. However, all the fungicide treatments were significantly different when compared with inoculated and non-inoculated checks.

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

Variety	Treatments	Dosage Fl. oz/A	Application Timing	Fusarium Head Blight			DON (ppm)	Test Weight (lbs/bu)	Plump (%)	Yield (bu/A)
				Incidence (%)	Severity (%)	Index				
Tradition	Untreated check (Inoculated)	...	...	37	13	5.2	20.4	43	82	86
Tradition	Prosaro	6.5	Heading	9	8	0.68	8.03	45	89	100
Tradition	Prosaro+Caramba	6.5 + 14	Heading + 4 days after heading	3	2	0.06	1.8	46	92	101
Tradition	Caramba+Folicur B	14 + 4	Heading + 4 days after heading	8	4	0.47	9.1	45	90	101
Tradition	Proline+Folicur B	5.7 + 4	Heading + 4 days after heading	15	6	2.2	5	46	91	99
Tradition	Untreated check (non-inoculated)	...	...	20	10	2.1	16.9	43	81	81
Quest	Untreated check (Inoculated)	...	...	45	18	9.2	15.1	42	77	76
Quest	Prosaro	6.5	Heading	20	10	2.4	9.8	43	80	84
Quest	Prosaro+Caramba	6.5 + 14	Heading + 4 days after heading	8	6	0.42	2.2	45	86	96
Quest	Caramba+Folicur B	14 + 4	Heading + 4 days after heading	7	4	0.3	4	44	85	94
Quest	Proline+Folicur B	5.7 + 4	Heading + 4 days after heading	7	4	0.3	2.6	45	84	92
Quest	Untreated check (non-inoculated)	...	...	24	9	2.2	10	42	79	83
			Mean	17	8	2.1	8.7	44	85	91
			CV %	72	63	131	62	2	4	11
			LSD (5%)	17	7	4	8	1	5	14
Note: Untreated check (non-inoculated) received no artificial inoculum										
DON: Deoxynivalenol										

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