

Fungicide efficacy trial on winter wheat, 2019



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A fungicide efficacy trial was conducted on soft winter wheat in collaboration with industry to observe the performance of various fungicide products. A randomized, complete block design with four replications was superimposed on an existing stand of soft white winter wheat (cv. DynaGro 9241). The variety is moderately resistant to powdery mildew, Septoria leafspot and Fusarium head blight.

The fungicide products, rates and application timings employed are provided in the table below. All fungicide treatments included a nonionic surfactant (Induce) at the rate of 0.125 %. The fungicides were applied using a tractor mounted boom sprayer. The T1 (first joint; Feekes growth stage 6) treatments were applied on May 15 and the T2 (full flag leaf; growth stage 9) treatments on May 30. These vegetative applications utilized 14 gallons of water per acre, 33 psi and single XR8003 TeeJet nozzles. The heading treatments included an application at Feekes 10.5 (full heading) applied on June 12; Feekes 10.51 (50 % flowering) on June 14; and Feekes 10.51 + 5 days (late flowering) on June 19. These applications employed Turbo TeeJet Duo bodies with double 11001 nozzles, 32 psi., and 13 gallons of water per acre.

All results are provided in the table below. Statistical analysis will be performed using SAS 9.3 PROC MIXED method by Adam Byrne, Research Associate, MSU.

Grain measurements

The trial was harvested on July 26 using an International 2144 combine equipped with a Juniper HarvestMaster system that provided grain weight, test weight, and moisture. Grain samples were collected and, after passive air drying, 1000 kernel weights were determined. In general, the use of fungicides increased grain yields by 1 to 5 bu/ac., but there were no statistically significant differences between treatments. There were differences in both the grain moisture and test weights taken at harvest. The two are inversely related ($R^2 = 0.9861$).

Foliar disease ratings

Leaf diseases remained relatively low throughout the season. Nevertheless, a relative rating of Septoria leaf spot was taken on June 4 and 25 from mid-canopy, and an estimate of the percent of infected area on the flag leaves was estimated on July 10. A relative rating of powdery mildew was also taken on June 25 from mid-canopy leaves. There were no statistical differences.

Fusarium head scab rating

On July 10 (early dough stage), the incidence and severity of Fusarium head scab were scored. The incidence equates to the average number of symptomatic heads found within a 3 by 48 - foot area. Scab severity equates to the average amount of scab symptoms on infected heads as a percent. Generally, most treatments involving a fungicide application at flowering or later reduced the incidence and/or the severity. Here, the index is the number of visibly infected heads per area times the severity. Analysis for DON was performed by the Department of Plant Pathology, University of Minnesota.

Location:	JGDM McConnachie Fms Deckerville, MI
Collaborators:	Bayer, Syngenta & BASF, MI Wheat
Soil Type	Capac silt loam
Previous crop:	dry beans
Variety:	DynaGro 9242
Nitrogen rate:	125 lbs/ac
Plot design:	RCB
Replications:	four
Plot area:	17 x 50 ft
Treatment area:	116 x 50 ft
Harvest area:	15 x 48 ft
Planting date:	Sept 28, 2018
Seeding rate:	1.8 m/ac
Harvest date:	July, 22, 2019
Herbicide:	none
Insecticide:	none

Table 1: Effect of fungicides on crop performance and disease, Deckerville MI, 2019

fungicide treatments ¹			harvested grain				Septoria ³				P.M. ⁴		FHB ⁵			
#	product oz/acre	timing ²			yield,	harv	test	1000	June	Jun	Jul	Jun	Inci- dence #	sever- ity %	index %	DON ppm
		T1	T2	T3	13%M bu/ac	moisture %	wt lbs/bu	knl wt g	4 1 to 9	25 1 to 9	10 %	25 1 to 9				
1	non treated control	-	-	-	106.4	17.7 <i>d</i>	58.7 <i>a</i>	34.8	1.6	2.3	4.0	1.3	16.5 <i>ab</i>	17.5 <i>a</i>	2.84 <i>abc</i>	0.19
2	Nexicor 5	x			108.5	18.3 <i>d</i>	58.3 <i>ab</i>	34.2	1.0	1.5	2.8	0.8	11.0 <i>bc</i>	17.5 <i>a</i>	1.84 <i>abcde</i>	0.20
3	Nexicor 7		x		107.3	18.1 <i>d</i>	58.5 <i>a</i>	34.5	2.0	2.0	3.5	1.3	18.8 <i>a</i>	17.3 <i>a</i>	3.12 <i>a</i>	0.19
4	Nexicor 7; Caramba 13.5	x	x		108.7	18.5 <i>cd</i>	58.3 <i>ab</i>	34.8	1.0	1.8	2.3	0.8	12.5 <i>abc</i>	10.0 <i>bc</i>	1.25 <i>de</i>	0.09
5	Nexicor 5; Nexicor 7;Caramba 13.5	x	x	x	111.4	18.3 <i>d</i>	58.4 <i>ab</i>	34.6	1.0	1.5	2.3	1.0	16.3 <i>ab</i>	14.3 <i>abc</i>	2.27 <i>abcd</i>	0.17
6	Nexicor 5; Nexicor 7;Caramba 13.5 ⁶	x	x	x	109.5	17.7 <i>d</i>	58.6 <i>a</i>	35.3	1.4	1.8	2.5	0.8	12.8 <i>abc</i>	12.5 <i>abc</i>	1.68 <i>cde</i>	0.11
7	Caramba, 13.5			x	110.1	18.2 <i>d</i>	58.4 <i>a</i>	34.3	1.6	2.5	2.3	1.5	10.8 <i>bc</i>	17.5 <i>a</i>	1.80 <i>bcde</i>	0.08
8	Delaro 325 5; ProSaro 8.2	x	x		108.8	18.2 <i>d</i>	58.4 <i>ab</i>	34.7	1.0	1.8	2.8	0.8	9.3 <i>c</i>	14.0 <i>abc</i>	1.34 <i>de</i>	0.12
9	Delaro 325 5; USF0115 10.3	x	x		110.8	19.6 <i>bc</i>	57.7 <i>bc</i>	34.6	1.0	1.8	2.8	1.3	10.8 <i>bc</i>	13.3 <i>abc</i>	1.53 <i>de</i>	0.10
10	Trivapro 9.4; Miravis Ace13.7	x	x		111.8	17.7 <i>d</i>	58.8 <i>a</i>	34.7	1.1	1.8	2.8	1.0	13.3 <i>abc</i>	15.0 <i>ab</i>	1.90 <i>abcde</i>	0.19
11	Miravis Ace 13.7 (F 10.5)			x	109.7	20.4 <i>b</i>	57.5 <i>c</i>	34.7	2.1	2.0	3.0	2.0	16.3 <i>ab</i>	17.0 <i>a</i>	3.04 <i>ab</i>	0.16
12	Miravis Ace 13.7 (F 10.51)			x	111.0	20.3 <i>b</i>	57.1 <i>c</i>	35.0	2.0	2.5	2.3	2.5	6.8 <i>c</i>	12.5 <i>abc</i>	0.86 <i>e</i>	0.16
13	Miravis Ace 13.7 (F 10.51+5 days)			x	110.4	22.8 <i>a</i>	55.8 <i>d</i>	35.1	1.0	2.0	2.3	1.3	7.0 <i>c</i>	8.8 <i>c</i>	0.68 <i>e</i>	0.13
14	tebuconazole 4 (F 10.51) plus Miravis Ace 13.7 (F 10.51+5 days)			x	111.3	22.5 <i>a</i>	56.2 <i>d</i>	35.6	1.4	2.3	2.5	1.5	6.5 <i>c</i>	13.8 <i>abc</i>	0.90 <i>e</i>	nd
<i>P value</i>				0.3500	<0.0001	<0.0001	0.2805	0.0232	0.9539	0.8529	0.7782	0.0102	0.0472	0.0033	0.2383	

¹ all fungicides applied with Induce nonionic surfactant at 0.125%.

² T1 = first joint (Feekes g.s.6; May 15); T2 = full flag (g.s.9; May 30); T3 = early flower (g.s.10.5; June 14) unless specified otherwise (T1mts 11, 13, & 14).

³ Septoria leaf spot in rated on a relative scale of 1 to 9 (1= no disease).

⁴ Powdery mildew rated on a relative scale of 1 to 9 (1= no disease).

⁵ incidence of scabby heads in 3 x 48 ft area; severity is % of infected heads exhibiting visable symtoms; index=severity x incidence; nd = non detectable DON level.

⁶ 2 gal /ac of CoRon fertilizer tank-mixed with Caramba at g.s.10.51.

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