

Fungicide efficacy trial on winter wheat, 2018

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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. Ambassador soft white winter wheat was used in a randomized, complete block design with four replications. The variety is susceptible to Septoria and Stagonospora leaf spots; Stripe rust and Leaf rust; and Fusarium head scab.

The fungicide products, rates and application timings employed in this trial 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 14 and the T2 (full flag leaf; growth stage 9) treatments on May 25. Both timings utilized 14 gallons of water per acre, 33 psi and single Turbo TeeJet 11002 nozzles. The treatment of Miravis Ace at g.s. 10.3 (heads emerging) was applied on May 30 and all T3 (early to mid- flower; growth stage 10.52) treatments were applied on June 6. These applications employed Turbo TeeJet Duo bodies with double 11001 nozzles, 35 psi., and 15 gallons of water per acre.

Only a trace of Septoria leaf spot developed during the tillering and early jointing stages, persisting within the lower canopy through flowering. As the crop began to head, a trace of Powdery mildew was evident on the second and third leaves while a small amount of Stagonospora leaf spot infected the flag leaf. On June 14 and 22 an attempt was made to conduct a relative rating of Septoria on using a scale of 0 to 10 (0 denoting no disease). On June 25, a relative 0 to 10 rating for powdery mildew within the mid-canopy and a percent of Stagonospora leaf spot on the flag was conducted. On June 29, the incidence and severity of Fusarium head scab evaluated despite very low levels. The incidence equates to the number of symptomatic heads found within the entire plot area (12.5 x 55 feet). Scab severity indicates the average amount of scab symptoms on infected heads as a percent.

The trial was harvested on July 11 using an International 2144 combine equipped with a Juniper HarvestMaster system that provided grain weight, test weight, and moisture. Grain samples were sent to University of Minnesota for analysis of DON (the results indicated that DON was below detectable levels and, therefore, are not shown). Statistical analysis was performed using SAS 9.3 PROC MIXED method by Adam Byrne, Research Associate, MSU. Results are provided in table 1.

The lack of precipitation coupled with relatively high evapotranspiration levels from mid-May through mid-June (flag leaf through flowering) limited the performance of wheat and greatly curtailed the development of foliar and head diseases. This stress also likely contributed to the variability in crop performance seen within the trial site.

Table 1 provides the results of the trial. There was only a 4 bu/ac range in grain yields and differences were not significant ($P \geq 0.05$). The use of Miravis Ace at growth stage 10.52 (treatments 9 and 11) resulted in significantly higher grain moisture and lower test weight. It may be that the higher grain moisture tended to elevate the test weights as both measurements are made at harvest. It is interesting to note that these treatments did not result in lower thousand-kernel weights [kernel weight is determined on dry grain].

Location:	JGDM McConnachie Fms Deckerville, MI
Collaborators:	Bayer, Syngenta & BASF, MI Wheat
Soil Type	Capac silt loam
Previous crop:	dry beans
Variety:	Ambassador
Nitrogen rate:	125 lbs/ac
Plot design:	RCB
Replications:	four
Plot area:	15 x 60 ft
Treatment area:	15 x 60 ft
Harvest area:	12.5 x 55 ft
Planting date:	Sept 28, 2017
Seeding rate:	1.8 m/ac
Harvest date:	July 11, 2018
Herbicide:	none
Insecticide:	none

Despite foliar disease levels being very low, there were some significant differences in the levels of Septoria (June 14 only) and Stagonospora. Fusarium head blight symptoms were very scarce. However, here too, there were some significant differences. In this case, all heads within each 688 sq ft plot that exhibited Fusarium symptoms were counted. Generally, 1 to 7 heads per plot were evident. Despite this very low incidence, the data reveal a noteworthy pattern where the T3 (flowering) application of fungicides reduced the number of scabby heads by roughly half when compared to all treatments. This degree of reduction is comparable to what we would expect under heavy Fusarium pressure.

Table 1: Effect of fungicides on crop performance and disease levels in soft winter wheat, Deckerville MI, 2018

fungicide treatments ¹			harvested grain				Septoria ³		P.M. ⁴	Stago ⁵	FHB ⁶			
#	product oz/acre	timing ²			yield,	harv	test	1000	June	'June	June	June	Incidence	severity
		T1	T2	T3	13%M	moist	wt	kn1 wt	14	22	25	25	per plot	per head
			bu/ac	%	lbs/bu	g	1 to 10	1 to 10	1 to 10	%	#	%		
1	non treated control	-	-	-	101.2	13.5 cd	60.0 ab	41.7	3.8 a	2.0	1.6 c	0.7 a	4.3 abc	57.5 abc
2	propiconazole, 4	x			100.8	12.9 d	60.5 a	40.3	1.1 ef	1.9	0.5 bc	0.1 ab	4.8 abc	42.5 abcd
3	Delaro, 4	x			104.1	13.5 cd	60.0 ab	41.6	1.4 def	1.6	1.0 bc	0.2 abc	3.3 abcd	57.5 abc
4	Delaro, 8	x			103.1	13.5 cd	60.0 ab	42.2	1.8 cdef	2.0	0.5 abc	0.2 ab	3.5 abcd	50.0 abcd
5	Delaro, 8		x		103.7	12.9 d	60.5 a	41.4	2.0 bcde	1.6	0.3 abc	0.3 bc	4.5 abc	65.0 ab
6	Delaro, 4; Prosaro, 8.2	x	x		101.9	13.1 cd	60.3 ab	41.8	1.5 cdef	1.8	0.1 ab	0.3 def	2.0 de	40.0 bcde
7	Prosaro, 8.2			x	101.5	13.5 cd	59.9 ab	41.0	2.1 bcd	2.0	0.0 a	0.0 f	1.5 e	22.5 e
8	Trivapro 9.4	x			102.9	13.2 cd	60.2 ab	41.6	1.5 cdef	2.3	0.3 bc	0.1 bcd	3.5 abcd	67.5 ab
9	Trivapro 9.4; Miravis Ace, 13.7	x	x		104.9	15.9 a	57.8 d	42.1	1.0 f	1.8	0.0 a	0.0 f	2.0 de	27.5 cde
10	Miravis Ace, 13.7 (g.s.10.3)	-	-	-	102.5	14.2 bc	59.4 bc	41.1	2.4 bc	2.1	0.0 ab	0.1 ef	4.5 abc	40.0 abcde
11	Miravis Ace, 13.7			x	102.2	14.9 ab	58.6 cd	41.8	2.8 b	2.1	0.3 a	0.0 cdef	2.5 bcde	55.0 abcd
12	Nexicor, 5	x			103.0	13.7 cd	59.9 ab	42.2	1.6 cdef	1.6	0.5 ab	0.0 abc	4.8 a	72.5 a
13	Nexicor, 7		x		102.0	12.7 d	60.6 a	40.8	1.6 cdef	1.9	0.1 bc	0.1 cdef	3.5 abcd	42.5 abcd
14	Nexicor, 7; Caramba,	x	x		105.3	13.0 d	60.4 a	40.8	1.1 ef	1.6	0.0 a	0.0 ef	2.5 cde	57.5 abcd
15	Nexicor, 5 & 7, Caramba 13.5	x	x	x	105.1	13.2 cd	60.2 ab	41.2	1.3 def	1.9	0.1 ab	0.0 cdef	1.8 de	27.5 de
16	Caramba, 13.5			x	103.7	13.4 cd	60.1 ab	40.5	2.4 bc	2.1	0.0 ab	0.0 ef	2.5 bcde	40.0 abcde
<i>P value</i>				0.9080	0.0002	0.0001	0.2650		0.0001	0.7340	0.0106	0.0001	0.0090	0.0288

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

² T1 = first joint (Feekes g.s.6; May 14); T2 = full flag (g.s.9; May 25); T3 = early flower (g.s.10.52; June 6). Trmt 10 applied at g.s.10.3 on May 30.

³ Septoria leaf spot in lower canopy rated on a relative scale of 0 to 10 (0= no disease).

⁴ Powdery mildew in lower canopy rated on a relative scale of 0 to 10 (0= no disease).

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⁵ Stagonospora leafspot rating expressed as amount of visible disease on surface of flag leaf as percent.

⁶ incidence of scabby heads in entire plot area (12.5 x 55 ft); severity is the percent of infected heads exhibiting visable symtoms.



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