

Fungicide efficacy trial on winter wheat, 2017

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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 and leaf rust, and Fusarium head scab. It is moderately resistant to powdery mildew.

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 %, except Adepidyn, which had a use rate of 0.025 %, and Badge SC, which had none. The fungicides were applied using a tractor mounted boom sprayer. The T1 (first joint; Feekes growth stage 6) treatments were applied on May 4 and the T2 (full flag leaf; growth stage 9) treatments on May 22. Both timings utilized 16 gallons of water per acre, 42 psi and Turbo TeeJet 11002 nozzles. The T3 (early flower; growth stage 10.51) treatments were applied on June 7 using Turbo TeeJet Duo bodies with double 11001 nozzles, 40 psi, and 15 gallons of water per acre.

Only a trace of powdery mildew and Septoria leaf spot developed during the tillering and early jointing stages. As the crop began to head, Septoria and Stripe rust became the predominant diseases. On June 9 (late flowering), Septoria was rated on a scale of 0 to 10 (0 denoting no disease) on the second and third leaves and Stripe rust was rated on the flag leaf expressed as a percent of leaf area showing evidence of disease. By June 29 (milk stage), both diseases were evident on the flag leaves and the rating was repeated using the percent of leaf area. Additionally, despite very low incidence, heads within ten 55-foot rows exhibiting symptoms of Fusarium head scab were counted.

The plots exhibited a variation of coloration as the plants neared maturity (figure 1). In general, the higher performing treatments were brighter in appearance. Yields were adjusted where significant lodging occurred (replication II, treatment 9; replication IV, treatments 12 and 7).

The trial was harvested on July 17 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. Statistical analysis was performed using SAS 9.3 PROC MIXED method by Adam Byrne, Research Associate, MSU.

All results are provided in table 1. Badge SC (copper oxychloride plus &copper hydroxide) appeared to inhibit the development of Septoria but its use did not lead to a significant improvement in yield. All other products applied at T1 as the sole application suppressed Septoria development and resulted in an average yield improvement of 4.1 bu/ac. Where a fungicide was used exclusively at T3, the yields were increased by an average of 10.4 bu/ac. Fusarium head scab pressure was very low and therefore differences are suspect. Nevertheless, some statistically significant differences were found.

Location:	JGDM McConnachie Fms Sandusky, MI
Collaborators:	Bayer, Syngenta & BASF, MI Wheat
Soil Type	Capac silt loam
Previous crop:	dry beans
Variety:	Ambassador
Nitrogen rate:	120 lbs/ac
Plot design:	RCB
Replications:	four
Plot area:	15 x 60 ft
Treatment area:	15 x 60 ft
Harvest area:	15 x 55 ft
Planting date:	Sept 25, 2016
Seeding rate:	1.8 m/ac
Harvest date:	July 17, 2017
Herbicide:	none
Insecticide:	none



Table 1: Effect of fungicides on the performance of soft winter wheat and disease levels,

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fungicide treatments ¹		timing ²			harvested grain			septoria ³		stripe rust ⁴		FHB ⁵										
					moist. %	test wt lbs/bu	yield bu/ac	9-June 1 to 10	26-June %	9-June %	26-June %	heads #	DON %									
		T1	T2	T3																		
1	non treated control				14.8	b	60.1	b	110.9	j	5.3	a	16.8	a	2.3	a	7.0	bc	5.5	a	0.12	a
4	Adepidyn 8.6 oz+Tilt 3.3 oz			x	16.7	a	58.9	c	124.8	abc	2.8	cde	0.6	f	1.8	ab	1.9	de	2.3	cd	0.01	de
5	Nexicor 5 oz	x			14.6	bc	60.8	a	115.4	ghi	1.1	efg	11.5	ab	0.3	de	6.3	bcd	3.0	bcd	0.06	abcd
6	Nexicor 5 oz; Caramba 13.5 oz	x	x		14.7	bc	60.7	a	125.1	abc	1.0	fg	4.0	cdef	0.4	de	1.5	de	2.5	cd	0.08	abc
7	Nexicor 5 oz; Nexicor 5 oz; Caramba 13.5	x	x	x	14.8	b	60.6	ab	126.4	abc	0.8	g	1.5	ef	0.1	e	1.0	e	1.8	d	0.01	de
8	USF0728 4 oz	x			14.6	bc	60.7	a	116.8	fgh	1.3	defg	10.7	abc	0.6	bcd	6.5	bcd	2.8	cd	0.06	abcd
9	USF0728 8 oz		x		14.6	bc	60.8	a	120.1	def	0.9	g	3.3	cdef	0.1	e	4.3	bcd	2.0	cd	0.13	ab
10	USF0728 4 oz; Prosaro 8 oz		x	x	14.7	bc	60.7	a	120.8	cdef	2.6	cdef	3.0	def	0.6	cde	4.5	bcd	3.8	abcd	0.03	bcde
11	USF0728 4 oz; Prosaro 8 oz	x	x		14.6	bc	60.8	a	122.0	bcde	1.8	defg	2.0	ef	0.9	bcd	1.8	de	2.0	cd	0.00	e
12	Prosaro 6.5 oz			x	14.5	bc	60.8	a	118.0	efg	4.3	abc	5.0	bcde	2.3	a	3.5	cde	4.3	abcd	0.02	cde
13	Prosaro 8 oz			x	14.9	b	60.5	ab	118.4	fgh	5.0	abc	3.0	def	2.0	a	5.5	bcd	2.8	cd	0.03	bcde
14	Caramba 13.5 oz			x	14.7	bc	60.7	a	124.0	abcd	3.5	bc	4.0	cdef	1.6	ab	2.8	cde	3.8	abcd	0.02	cde
15	Propicon 3.6 EC 4 oz	x			14.5	bc	60.9	a	112.8	hij	1.5	defg	12.0	ab	1.0	abc	11.8	ab	5.5	a	0.11	a
16	Badge SC	x			14.4	c	60.9	a	111.3	ij	2.9	cd	9.0	abcd	2.4	a	18.0	a	5.3	ab	0.11	a
P value					<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0003		0.0175		0.0022	

- ¹ all fungicides applied with Induce nonionic surfactant at 0.125% except Adepidyn had 0.25% and Badge SC had none.
- ² T1 = first joint (Feekes g.s. 6); T2 = full flag (g.s.9); T3 = early flower (g.s.10.51).
- ³ Septoria leaf spot rated on a relative scale of 0 to 10 (0= no disease).on June 9 and as a percent of flag leaf area on June 26.
- ⁴ stripe rust rating expressed as amount of visible disease on surface of flag leaf as percent.
- ⁵ incidence of scabby heads in ten 55 foot rows; DON levels below 0.05 are undetectible and are assign a value of 0.

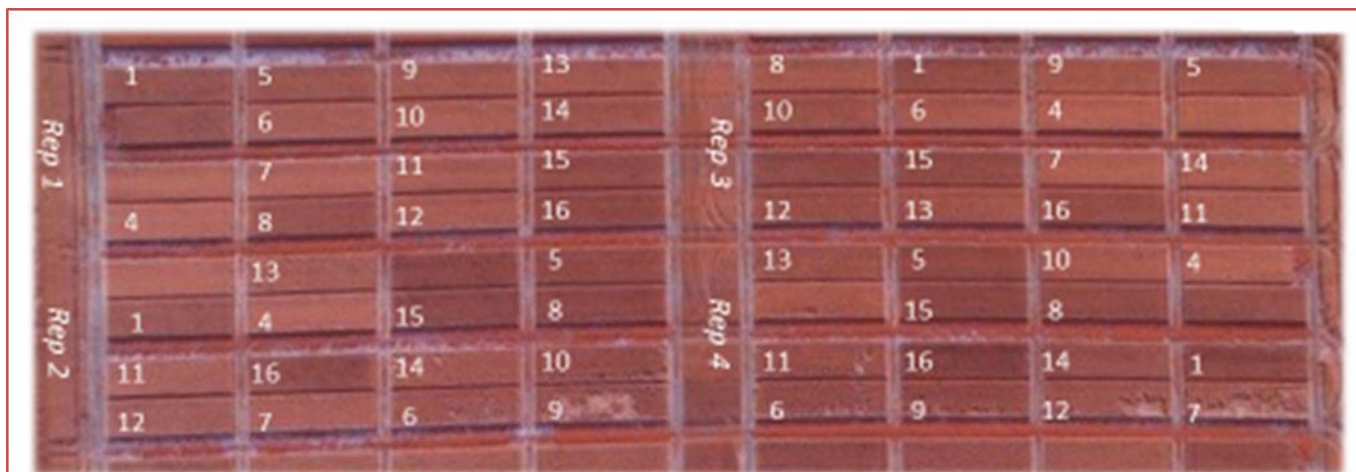


Figure 1: Aerial NIR photo by Secher Site Specific LLC

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