Fungicide efficacy trial on winter wheat, 2015

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Location:	JGDM McConnachie Fms Deckerville, MI
Collaborators:	Dupont, Bayer, BASF
Soil Type	Capac silt loam
Previous crop:	dry beans
Variety:	P25W43
Nitrogen rate:	125 lbs/ac
Plot design:	RCB
Replications:	four
Plot area:	18 x 65 ft
Treatment area:	17 x 65 ft
Harvest area:	15 x 60 ft
Planting date:	Oct 2, 2014
Seeding rate:	1.8 m/ac
Harvest date:	July 24, 2015
Herbicide:	none
Insecticide:	none

Each year a fungicide efficacy trial is 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 a commercial stand of Pioneer 25W43 soft white winter wheat. The variety is rated as being comparatively susceptible to powdery mildew and moderately susceptible to Septoria leaf spot, Stagonospora leaf blotch, leaf rust and Fusarium head blight.

The fungicide products, rates and application timings are provided in the table below. The fungicides were applied using a tractor mounted boom sprayer. All treatments included a nonionic surfactant (Induce) at the rate of 0.125 percent. The T1 (feekes growth stages 6) applications were made on May 14 using 12 gallons of water per acre, 40 psi and Turbo TeeJet 11002 nozzles. TheT2 (growth stage 9) applications were made on May 25 using 15 gallons of water per acre, 40 psi and Turbo TeeJet 11002 nozzles. The early flower treatment timing (T3; growth stage 10.51) was applied on June 9 using Turbo TeeJet Duo bodies with double 11001 nozzles, 15 gallons of water per acre, and 45 psi.

Other than a trace of Septoria leafspot and powdery mildew, leaf diseases were not found throughout the vegetative stages. At late flowering (June 11), an attempt was made to rate a low level of powdery mildew on a relative scale of 0 to 3, with "0" connoting no disease. As grain-fill progressed, Stagonospora leaf blotch quickly became the dominant disease on the flag leaf with visible symptoms on more than 10 percent of the flag leaf in the non-treated plots. Leaf rust could be found but at such a low and inconsistent level that meaningful ratings could not be made. At late milk (June 29), the incidence (number of heads with symptoms in 75 feet of row) and severity (average percent of head exhibiting symptoms) of Fusarium head blight was estimated.

The trial was harvested on July 24 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 where DON analyses were performed. Statistical analysis was performed by the Adam Byrne, Research Associate, MSU.

There was not a statically significant increase in grain yield where a fungicide was only applied during a vegetative stage (T1 and T2 timings). However, there was significant improvement wherever Prosaro or Caramba was applied at flowering (T3), except where Prosaro was

combined with the Baythroid insecticide. The severity of powdery mildew was low and inconsistent so the reliability of the ratings is questionable. Nevertheless, there were significant improvements using the vegetative treatments. The rating was conducted only two days following the T3 treatments therefore there was likely little effect from the Prosaro or Caramba treatments made only two days earlier. All treatments resulted in a significant decrease in leafspot (primarily Stagonospora) except where a low rate of Aproach Prima was applied at T1 [the investigator failed to follow with a T3 fungicide application as proscribed in protocol].

The effect of fungicides on Fusarium head blight was estimated using disease incidence, severity and, most importantly, DON levels. All three indicators showed significant advantage to treatments that included Prosaro or Caramba at T3. In this trial, there was no advantage to applying an increased rate of Prosaro or Caramba, nor was there improvement in DON where Caramba was followed by Prosaro.

Table 1: Effect of fungicides on the performance of soft winter wheat and disease levels
Deckerville, MI, 2015

	fungicide treatment [1]	timing [2]			harvested grain						powdery mildew [3]		leaf spot [4]		fusarium head scab					
					moist.	test wt.		yield							incid. [5]		severity [6]		DON	
		T1	T2	T3	%	lbs/bu		bu/ac 13M			0-3		%		head #		%		ppm	
1	non treated control				13.5	60.7	a	114.3	e		1.25	a	14.8	a	18	a	30	a	0.44	bc
2	Stratego Yld 4oz		x		13.9	60.5	abc	116.9	de		0.25	bc	5.8	b	12	b	24	abc	0.68	a
3	Prosaro 6.5oz			x	14.2	60.0	cdef	120.5	bcd		1.50	a	0.3	de	2	c	8	de	0.29	cde
4	Prosaro 8.2oz			x	14.4	59.9	def	125.2	ab		0.75	ab	0.4	cde	1	c	9	de	0.34	cd
5	Stratego Yld 2oz ; Prosaro 6.5oz	x		x	14.2	60.0	cdef	126.6	ab		0.00	c	0.1	e	2	c	5	e	0.24	de
6	Priaxor 2oz; Caramba 13.5oz	x		x	14.1	60.2	bcdef	122.5	abc		0.75	abc	0.9	cde	2	c	9	de	0.20	de
7	Priaxor 4oz; Caramba 13.5oz	x		x	13.8	60.2	bcdef	123.8	ab		0.00	c	1.0	c	2	c	1	de	0.25	de
8	Priaxor 2oz; Caramba 17.0oz	x		x	14.2	60.1	cdef	122.6	abc		0.75	ab	1.4	cd	1	c	12	de	0.24	de
9	Priaxor 2oz; Caramba 13.5oz		x	x	14.3	60.0	def	124.6	ab		0.25	bc	0.4	cde	1	c	11	de	0.18	e
10	Caramba 13.5oz			x	14.0	60.3	abcde	121.4	bcd		0.75	ab	0.8	cde	2	c	7	de	0.18	e
11	Approach 3oz; Appr. Prima 6.8	x	x		14.1	60.4	abcd	118.1	cde		0.25	bc	4.8	b	17	a	17	bcd	0.54	ab
12	Appr. Prima 6.8oz		x		13.8	60.6	ab	118.6	cde		0.25	bc	4.9	b	11	b	17	bcd	0.60	ab
13	Appr. Prima 6.8oz; Prosaro 8.2		x	x	14.5	59.8	f	126.3	a		0.25	bc	0.3	cde	3	c	8	de	0.29	cde
14	Appr. Prima 3.4oz	x			13.8	60.7	a	117.3	de		0.25	bc	13.8	a	15	ab	27	abc	0.55	ab
15	Prosaro 6.5oz + Baythroid 3oz			x	14.2	60.1	cdef	118.9	cde		1.50	a	0.8	cde	2	c	13	de	0.19	e
16	Caramba 13.5oz; Prosaro 6.5oz [7]			x	14.5	59.8	ef	122.8	abc		0.75	abc	0.4	cde	2	c	15	cd	0.24	de
	P value				0.074	<0.0012		<0.0001			<0.0077		<0.0001		<0.0001		<0.0002		<0.0001	

[1] all fungicides applied with Induce nonionic surfactant at 0.125% ;

[2] T1 = full tillering (g.s. 5-6); T2 = full flag (g.s.9); T3 = early flower (F10.51).

[3] P.M.levels were low; rated on a relative scale of 0 to 3 (0= on disease).

[4] primarily stagonospora with some leaf rust; expressed as amount of visable disease on surface of flag leaf as percent.

[5] incidence of heads within 15 feet of row exhibiting fusarium symtom.

[6] severity of fusarium as average amount of infected heads exhibiting symptoms expressed as percent.

[7] Caramba applied at 10.51 followed by Prosaro 2 days later