

WHEAT VARIETY RESPONSE TO FUNGICIDE TREATMENT IN 2013

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Resistant varieties and timely fungicide applications are two powerful management tools available to help KY wheat growers reduce damage from *Fusarium* head blight, or head scab. In 2013, variety x fungicide trials were conducted in replicated plots at Lexington and Princeton, KY. Entries in the 2013 test were grown in 6-row 10 ft. plots, planted after corn, the residue of which had been conventionally tilled. At each location, entries were replicated three times and subjected to 2 treatments: fungicide-treated and control. Entries in the test consisted of 24 varieties and breeding lines, all of which were also entered in the state wheat variety trial. The test was inoculated with scabby corn on April 9th at Princeton and April 16th at Lexington. The inoculum had plenty of time to develop and release spores during flowering. At Lexington, plots were also sprayed with a 50 000 spore/ml suspension during flowering. Fungicide-treated plots were sprayed at flowering with Prosaro (6.5 fl. oz./A) and Induce (0.125% w/v). At Lexington, 21 days after flowering, scab symptom incidence and severity were counted and index calculated. Scab incidence is the percentage of wheat heads having any scab symptoms; severity is the percentage coverage of the heads that have symptoms; index is a combination of incidence and severity and is also expressed as a percentage. Rating is similar to index but is taken by assessing the plot as a whole (rather than counting individual heads and spikelets) and is expressed on a 0-9 scale where 0 is no scab and 9 is completely diseased. After harvest, yield, test weight, and *Fusarium* damaged kernels (FDK) were measured. FDK is the percentage of scabby seed or tombstones in a representative grain sample. Following fungicide treatment at both locations, wheat

yield and test weight were significantly increased and FDK (due to head scab) was significantly reduced (Table 1). Scab symptoms were also overall significantly reduced by fungicide (Table 2). Varieties and lines varied somewhat in their individual yield, test weight, FDK and lodging responses to fungicide and these responses also varied by location (Table 3). In almost every case, however, yield and test weight increased following treatment by fungicide. FDK, for every single line and variety at both Princeton and Lexington was reduced by fungicide application. The heading and height of individual varieties and lines varied between Lexington and Princeton, but not between fungicide treated and non-treated at each location (Table 4). The effects of fungicide treatment on scab symptoms also varied among varieties and lines (Table 5) although fungicide treatment reduced every measure of scab symptom, for every variety or line (except for ratings of KY03C-1237-05, Pioneer variety 25R32 and Truman which were 0 for both treated and untreated).

Lodging was a problem this year, especially at Princeton, and probably reduced average yields relative to Lexington (Table 3). Interestingly, this year, lodging was significantly higher in fungicide treated wheat (Table 1).

To minimize the risks from scab use best management practices by planting scab resistant varieties and applying fungicides when weather favors disease development. The *Fusarium* head blight Prediction Center (<http://www.wheatscab.psu.edu/riskTool.html>) provides useful information when deciding whether to spray fungicide to control scab.

Table 1. Average Effect of Fungicide Application on 24 Wheat Varieties and Lines at Lexington and Princeton Combined in 2013

	Yield	Test Weight	FDK	Lodging
Treatment	bu/acre	lb/bu	%	%
Control	63.4a	51.7a	8.8a	16.0a
Fungicide	82.9b	56.4b	1.4b	29.1b

Means followed by different letters are significantly different from one another (P<0.001).
 The chance of fungicide having indistinguishable effects on lodging at both locations was P=0.03, the effects were significant at both Princeton (P=0.0016) and Lexington (P=0.035)

Table 2. Average Effect of Fungicide Application on Scab Symptoms of 24 Wheat Varieties and Lines at Lexington in 2013

	Rating	Incidence	Severity	Index
Treatment	0-9	%	%	%
Control	1.8a	46.3a	38.9a	20.0a
Fungicide	0.1b	8.3b	20.0b	1.9b

Means followed by different letters are significantly different from one another (P<0.001).

Table 3. 2013 Yield, Test Weight, FDK and Lodging Responses of 24 Wheat Varieties and Lines to Fungicide Treatment and Location.

	Lexington								Princeton							
	Control				Fungicide				Control				Fungicide			
	Yield	Test Weight	FDK	Lodging	Yield	Test Weight	FDK	Lodging	Yield	Test Weight	FDK	Lodging	Yield	Test Weight	FDK	Lodging
Variety	bu/acre	lb/bu	%	%	bu/acre	lb/bu	%	%	bu/acre	lb/bu	%	%	bu/acre	lb/bu	%	%
AgriMAXX 413	78.6	49.5	11.8	0.0	109.9	55.5	1.0	0.0	54.6	48.3	###	0.0	86.7	40.3	2.9	1.7
BECK 135	83.3	52.6	6.6	0.0	95.4	56.5	1.1	0.0	43.0	50.5	9.5	56.7	45.1	55.4	0.9	86.7
Dyna-Gro 9042	68.9	49.5	11.5	0.0	103.2	56.2	1.5	0.0	46.4	48.9	###	40.0	81.4	51.5	2.2	58.3
Dyna-Gro Dinah	89.7	56.2	5.2	0.0	100.9	58.0	0.4	30.0	50.3	55.2	5.2	48.3	75.5	57.8	1.3	88.3
KAS S1100	63.2	49.9	11.3	0.0	75.8	55.3	2.4	10.0	46.1	47.2	###	38.3	63.2	55.8	0.9	55.0
KAS S1200	66.2	46.5	23.4	0.0	107.1	55.4	1.5	0.0	58.6	49.8	9.7	26.7	95.2	56.3	1.7	13.3
KY03C-1002-02	92.4	52.9	7.2	0.0	102.0	55.8	0.5	0.0	72.4	53.8	5.0	23.3	88.1	58.2	1.8	38.3
KY03C-1237-05	94.8	54.8	3.9	0.0	114.6	56.9	0.9	0.0	52.0	52.6	9.2	0.0	66.2	58.2	0.6	26.7
KY03C-1237-07	91.3	54.4	4.1	0.0	101.8	56.9	0.3	0.0	67.6	54.0	4.9	0.0	82.6	57.4	0.1	6.7
KY03C-1237-10	76.7	51.6	11.2	0.0	112.8	56.6	0.8	0.0	67.4	50.5	4.7	0.0	76.4	57.9	0.5	53.3
KY03C-1237-11	75.9	52.8	10.2	0.0	99.5	56.5	2.2	0.0	46.0	52.9	###	0.0	78.2	60.0	1.2	58.3
KY03C-1237-12	78.5	50.8	9.4	0.0	99.4	56.6	2.5	0.0	63.3	53.2	4.7	0.0	87.3	58.0	0.2	23.3
KY03C-1237-28	74.3	54.8	2.3	0.0	73.5	57.0	0.6	40.0	37.4	-	5.7	63.3	57.2	58.8	0.5	45.0
KY03C-1237-32	77.6	53.9	7.5	0.0	104.2	58.1	0.5	0.0	52.8	49.8	7.2	8.3	94.3	57.6	0.6	1.7
KY03C-1237-39	80.3	51.8	9.9	0.0	102.7	56.2	1.1	0.0	57.1	52.1	7.6	1.7	56.1	51.8	3.1	63.3
KY04C-3006-33-14-3	83.1	54.2	6.8	0.0	96.9	58.4	0.5	0.0	44.3	55.1	7.2	63.3	65.3	58.4	1.5	56.7
Pembroke 2008	69.4	50.2	14.0	0.0	110.3	57.4	1.2	0.0	61.4	52.6	5.6	3.3	89.8	57.3	0.6	0.0
Pioneer variety 25R32	88.2	55.0	2.5	0.0	96.6	57.9	0.5	0.0	40.0	-	7.6	40.0	42.7	61.3	0.7	68.3
Pioneer variety 25R56	84.8	51.5	10.4	0.0	89.2	54.9	3.9	16.7	40.4	50.0	###	86.7	50.9	56.2	1.4	90.0
Pioneer variety 26R22	54.6	48.2	16.1	0.0	113.1	55.0	2.2	0.0	37.9	-	###	26.7	58.9	55.6	0.7	31.7
SS 8700	81.4	49.3	14.0	0.0	88.7	53.6	5.6	16.7	39.2	-	###	8.3	51.6	57.2	2.0	70.0
SYNGENTA W1104	63.8	49.3	12.9	40.0	71.2	53.8	4.5	60.0	26.3	-	###	91.7	42.3	59.9	2.9	93.3
Truman	67.4	55.6	1.3	10.0	91.0	58.8	0.1	13.3	30.9	-	4.2	55.0	35.2	-	1.0	95.0
USG 3251	82.6	52.2	7.0	0.0	105.2	56.5	1.8	0.0	47.1	48.8	8.3	35.0	41.4	-	1.0	83.3
Mean	77.8	52.0	9.2	2.1	98.5	56.4	1.6	7.8	49.3	51.5	8.4	29.9	67.2	56.3	1.3	50.3
LSD (0.05)	8.8	2.7	6.3	16.5	16.2	1.1	1.7	24.2	15.6	3.7	3.6	47.6	20.6	7.7	1.9	46.9

Table 4. 2013 Heading Date and Height of 24 Wheat Varieties and Lines at Lexington and Princeton

Variety	Lexington		Princeton	
	Heading	Height	Heading	Height
	Days (April1=1)	Inches	Days (April1=1)	Inches
AgriMAXX 413	44.5	32.3	36.3	39.3
BECK 135	46.8	37.0	39.8	44.5
Dyna-Gro 9042	44.8	35.3	36.2	40.8
Dyna-Gro Dinah	45.7	39.0	37.0	42.5
KAS S1100	44.0	35.5	34.7	41.2
KAS S1200	44.3	32.8	36.0	40.2
KY03C-1002-02	44.2	34.0	35.0	39.7
KY03C-1237-05	48.8	37.2	40.7	41.3
KY03C-1237-07	45.2	34.3	34.8	39.5
KY03C-1237-10	44.2	35.5	35.0	39.7
KY03C-1237-11	48.7	37.8	41.5	43.0
KY03C-1237-12	45.3	33.7	35.5	39.0
KY03C-1237-28	45.2	36.8	36.2	41.8
KY03C-1237-32	43.8	33.0	34.7	37.7
KY03C-1237-39	44.5	35.5	35.0	40.8
KY04C-3006-33-14-3	43.5	37.3	35.5	42.8
Pembroke 2008	45.0	35.3	34.3	43.0
Pioneer variety 25R32	47.8	37.0	40.5	42.5
Pioneer variety 25R56	45.7	34.5	38.0	40.3
Pioneer variety 26R22	45.3	38.0	36.0	43.5
SS 8700	47.7	38.0	42.0	43.7
SYNGENTA W1104	45.8	36.8	41.5	41.2
Truman	50.0	40.3	42.7	45.8
USG 3251	46.7	36.7	38.8	44.2
Mean	45.7	38.0	37.4	41.6
LSD	1.0	2.0	1.4	1.8

Table 5. The Effect of Fungicide on Scab Symptoms and DON of 24 Wheat Varieties and Lines at Lexington in 2013

	Control					Fungicide				
	Rating	Incidence	Severity	Index	DON	Rating	Incidence	Severity	Index	DON
Variety	0-9	%	%	%	ppm	0-9	%	%	%	ppm
AgriMAXX 413	3.0	60.0	60.0	27.7	2.9	0.3	10.0	21.4	2.1	0.7
BECK 135	1.3	45.0	45.0	18.6	2.9	0.2	10.0	26.0	2.8	1.0
Dyna-Gro 9042	2.3	55.8	55.8	30.8	4.6	0.5	15.0	30.0	5.3	1.3
Dyna-Gro Dinah	0.8	24.2	24.2	9.7	1.4	0.0	3.3	16.2	0.6	0.5
KAS S1100	2.7	76.7	76.7	33.0	3.3	0.3	26.7	20.6	5.2	1.4
KAS S1200	4.7	77.5	77.5	41.2	6.3	0.7	16.7	28.0	5.1	1.4
KY03C-1002-02	1.8	68.3	68.3	22.3	3.1	0.0	9.2	11.8	1.2	0.9
KY03C-1237-05	0.0	22.5	22.5	3.5	2.4	0.0	4.2	10.8	0.5	1.2
KY03C-1237-07	0.8	51.7	51.7	13.3	1.4	0.0	5.8	9.8	0.6	0.4
KY03C-1237-10	3.2	66.7	66.7	35.0	4.3	0.0	7.5	25.5	1.7	0.6
KY03C-1237-11	1.0	25.0	25.0	8.8	3.8	0.0	3.3	15.7	0.6	1.4
KY03C-1237-12	1.3	63.3	63.3	14.6	3.9	0.0	13.3	8.3	1.1	1.4
KY03C-1237-28	0.5	28.3	28.3	6.7	1.4	0.0	4.2	9.8	0.4	1.2
KY03C-1237-32	3.7	61.7	61.7	29.2	2.6	0.0	10.8	19.3	2.0	0.5
KY03C-1237-39	3.0	59.2	59.2	33.2	2.8	0.0	6.7	31.8	2.2	1.0
KY04C-3006-33-14-3	1.7	37.5	37.5	21.7	2.4	0.2	3.3	26.0	1.0	0.9
Pembroke 2008	2.0	56.7	56.7	30.5	4.5	0.2	9.2	29.8	2.7	0.6
Pioneer variety 25R32	0.0	8.3	8.3	1.0	1.3	0.0	0.8	9.5	0.1	0.4
Pioneer variety 25R56	1.3	43.3	43.3	24.9	2.1	0.0	5.8	24.3	1.4	1.4
Pioneer variety 26R22	4.0	70.8	70.8	34.0	6.3	0.3	10.8	36.7	4.4	1.9
SS 8700	0.8	31.7	31.7	14.4	2.9	0.0	2.5	22.4	0.6	1.6
SYNGENTA W1104	1.0	36.7	36.7	12.5	3.6	0.0	10.0	17.9	2.0	2.1
Truman	0.0	0.8	0.8	0.1	1.1	0.0	0.8	6.5	0.0	0.3
USG 3251	1.3	39.2	39.2	14.1	3.1	0.2	10.0	21.5	2.2	1.6
Mean	1.8	46.3	38.9	20.0	3.1	0.1	8.3	20.0	1.9	1.1
LSD(0.05)	1.3	20.7	13.8	12.2	2.1	0.4	8.6	11.7	3.0	0.9