WHEAT (*Triticum aestivum*)
Fusarium head blight; *Fusarium graminearum*

W. W. Bockus, P. S. Baenziger, and W. Berzonsky
Dept. of Plant Pathology, Kansas State University, Manhattan, KS 66506, Dept. of Agronomy, University of Nebraska, Lincoln, NE 68583, and Dept. of Plant Science, South Dakota State University, Brookings, SD 57007

Reaction of Kansas, Nebraska, and South Dakota winter wheat accessions to Fusarium head blight (FHB), 2010.

A field experiment was conducted in Chase silty clay loam (pH = 6.5) near Manhattan, KS. Experimental design was a randomized complete block comprising the Hard (red and white) Winter Wheat Fusarium Head Blight Nursery with 48 entries from the Kansas, Nebraska, and South Dakota breeding programs. There were four replications and plots were single rows 7.5 ft long spaced 20 in. apart. Seed was sown 1 Oct 09 (1 bu/A). Air-dried corn kernels colonized by a single, aggressive isolate of *Fusarium graminearum* were spread throughout the test area on 8 Apr, 19 Apr, and 3 May (0.25 oz/ft^2 total). During anthesis, heads were kept wet using overhead, impulse sprinklers applying water 3 min. per hour from 9:00 pm until 6:00 am. For each plot, heading date (50% headed) was determined and visual estimations of percent symptomatic spikelets (FHB index) for each plot were taken on 25 May, 31 May, and 10 Jun. Plots were harvested with a combine on 23 Jun and grain sub-samples were rated for *Fusarium* damaged kernels (FDK). Ground grain samples were also sent to the North Dakota State University Toxicology Lab for determination of deoxynivalenol (DON) levels. Data for each rating date, the mean of all rating dates, heading date, yields, FDK, and DON levels in grain were subjected to analysis of variance followed by Fisher's least significant differences (LSD, $P = 0.05$). Correlations among parameters were also calculated.

Severe FHB developed as evidenced by disease ratings from the susceptible check Overley. All entries had significantly lower mean FHB ratings compared with Overley. The line SD08198 had the lowest mean rating, although nine other entries were statistically similar including the moderately resistant check cultivar Hondo. The entry KS08IFAFS1 had the lowest DON levels although eight other entries were statistically similar. Three entries were the cultivar Wesley with or without the resistance gene *Fhb1* added; this addition resulted in significant reductions in FDK and DON but not mean FHB Index. Reductions in DON were 61-72%. There were significant negative correlations between heading and mean FHB index ($n = 192$, $r = -0.7237$, $P < 0.0001$) and heading and yield ($n = 192$, $r = -0.3118$, $P < 0.0001$) indicating late maturing entries tended to have fewer symptoms and lower yields. There were also significant negative correlations between yield and FDK ($n = 192$, $r = -0.1451$, $P = 0.0447$) and yield and DON ($n = 192$, $r = -0.3381$, $P < 0.0001$) indicating that lower yielding entries tended to have high FDK and high DON. Finally, there were positive correlations between mean FHB index and FDK ($n = 192$, $r = 0.1680$, $P = 0.0199$), FHB index and DON ($n = 192$, $r = -0.1345$, $P = 0.0628$), and FDK and DON ($n = 192$, $r = 0.5188$, $P < 0.0001$) indicating positive associations among these disease parameters.

	FHB index (%)				Heading	Yield	FDK[x]	DON[w]
Entry[z]	25 May	31 May	10 Jun	Mean[y]	(Julian)	(oz/plot)	(%)	(ppm)
SD08198	0.0	2.0	23.8	8.6	143.0	3.2	31.3	31.4
NE01643 (Overland)	0.5	5.8	23.8	10.0	136.0	5.4	21.5	14.6
SD05W030	0.0	5.5	27.5	11.0	136.8	3.5	10.0	16.8
SD06156-1	0.0	4.5	32.5	12.3	140.8	1.7	20.0	28.8
SD05118-1	0.0	2.0	40.0	14.0	141.3	2.5	33.8	27.6
Hondo	0.5	7.5	36.3	14.8	136.0	2.7	25.0	15.7
SD07126	0.0	3.5	42.5	15.3	134.8	2.8	25.0	23.9
SD06069	0.0	14.3	32.5	15.6	140.3	3.7	21.3	20.2
Wesley FHB1	0.3	8.3	41.3	16.6	136.0	3.3	13.3	7.1
SD06158	0.5	8.5	45.0	18.0	140.8	4.6	20.0	17.1
NE05548	0.8	9.3	55.0	21.7	134.0	4.6	27.5	20.2
KS08FHB-31	4.0	21.3	40.0	21.8	128.3	3.3	3.5	5.8
SD07W053	1.3	15.5	52.5	23.1	134.8	2.9	9.0	24.0
Wesley FHB1 (repeat)	2.8	17.8	50.0	23.5	132.5	3.7	5.8	5.2
NE08527	4.3	22.5	52.5	26.4	130.5	5.3	9.3	7.7
Wesley	2.8	20.5	56.3	26.5	134.8	2.3	30.3	18.3
SD07184	2.3	18.8	58.8	26.6	129.0	3.3	13.8	16.1
KS020822-M-5	3.5	20.5	60.0	28.0	130.8	4.7	15.8	11.7
SD08138	2.3	23.0	67.5	30.9	130.8	3.5	15.0	19.4
SD05085-1	5.5	17.5	70.0	31.0	125.5	4.4	13.5	15.3
SD07056	7.0	28.0	58.8	31.3	129.5	2.7	17.5	18.8
NE02558	3.3	22.3	68.8	31.4	132.0	4.5	13.5	13.9

Entry[z]	FHB index (%) 25 May	31 May	10 Jun	Mean[y]	Heading (Julian)	Yield (oz/plot)	FDK[x] (%)	DON[w] (ppm)
NE01481	3.8	25.0	66.3	31.7	131.8	4.6	17.5	15.9
NE06430	5.8	30.0	63.8	33.2	127.0	3.3	12.3	13.7
KS030024-K-4	4.3	23.8	72.5	33.5	125.5	3.6	4.0	10.6
KS08IFAFS1	3.0	17.5	80.0	33.5	123.0	3.3	1.5	4.4
NE07688	4.5	22.5	75.0	34.0	135.8	2.8	38.8	22.5
NH03614 (Settler)	4.8	28.8	70.0	34.5	127.0	3.0	13.8	13.0
Karl 92	4.8	24.5	76.3	35.2	123.5	4.4	4.0	5.9
KS030024-K-3	4.8	28.0	75.0	35.9	125.8	3.3	8.0	10.8
KS08FHB-78	3.8	24.3	80.0	36.0	124.0	2.5	4.3	6.2
KS031027-FHB~8	8.5	26.8	75.0	36.8	123.8	3.9	8.8	8.6
KS021006-NT-9	9.3	31.3	76.3	38.9	128.3	2.1	20.0	18.4
NE08452	6.5	38.8	73.8	39.7	127.0	3.6	15.0	16.6
KS08P1-108	6.8	30.5	82.5	39.9	127.0	1.9	10.8	13.0
KS030101-M-2	7.0	33.3	80.0	40.1	124.8	3.3	10.8	10.9
KS020648-M-6	5.8	48.8	67.5	40.7	129.5	1.9	12.3	16.8
NW07534	8.0	42.5	72.5	41.0	131.0	2.2	18.8	24.1
KS07F5BULK01-K-7	12.0	42.5	71.3	41.9	126.3	3.1	9.0	9.7
SD07165	5.0	38.8	83.8	42.5	128.3	3.2	13.8	20.2
SD08174	5.8	45.0	77.5	42.8	128.8	1.9	22.3	17.6
NE04490	8.8	41.3	78.8	42.9	124.5	3.9	15.0	11.3
KS020947-K-13	11.8	40.0	77.5	43.1	126.5	2.4	23.8	23.3
SD08145	9.3	51.3	76.3	45.6	127.3	1.9	13.0	18.6
KS030124-K-4	8.5	41.3	90.0	46.6	125.0	3.0	13.8	13.5
KS030049-NT-7	15.0	46.3	83.8	48.3	124.0	2.2	12.3	12.9
NI04421	8.5	53.8	87.5	49.9	128.0	3.2	15.0	17.3
Overley	13.5	71.3	98.8	61.2	122.5	2.3	22.0	18.6
Mean	4.80	26.0	63.5	31.4	130.3	3.2	15.7	15.7
LSD (P=0.05)	3.1	8.8	25.7	10.2	2.1	0.92	11.7	6.0
R^2	0.80	0.89	0.60	0.79	0.95	0.74	0.57	0.75
CV	46.4	24.4	29.0	23.2	1.14	20.3	53.2	27.5

[z]Sorted by data in FHB index "Mean" column.
[y]Mean of all rating dates.
[x]Fusarium damaged kernels.
[w]Deoxynivalenol.

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