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

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Reaction of Kansas, Nebraska, and South Dakota winter wheat accessions to Fusarium head blight (FHB), 2013.

A field experiment was conducted in a Chase silty clay loam (pH = 6.5) near Manhattan, KS. The 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 on 9 Oct 2012 (1 bu/A). Air-dried corn kernels colonized by two aggressive isolates of *Fusarium graminearum* were spread throughout the test area on 1 Apr, 15 Apr, and 1 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 the entire plot were taken on 2 Jun, 3 Jun, 7 Jun, and 10 Jun. Plots were harvested with a combine on 3 Jul and grain sub-samples were rated for percentage *Fusarium*-damaged kernels (FDK). Ground grain samples from all plots were sent to the North Dakota State University Toxicology Lab for determination of deoxynivalenol (DON) concentrations. Data for heading date, each rating date, mean of the last three rating dates, FDK, and DON concentrations in grain were subjected to analysis of variance followed by Fisher's protected least significant differences (LSD, $P = 0.05$). Correlations among parameters were also calculated.

Severe FHB developed and the susceptible check Overley had the greatest mean FHB index (55.1%). All entries except SD08141, NE12408, NW07505, WB Stout, and NE12689 had significantly lower mean index values than Overley. The moderately-resistant check Everest had the lowest mean index rating (15.6%), although 14 other entries were statistically similar. Everest also had the lowest DON levels (9.7 ppm) although 20 other entries were statistically similar. The susceptible check Overley also had the highest DON levels (37.6 ppm) and there were three entries that were statistically similar to Overley. There were no significant correlations between heading and mean FHB index, heading and FDK, or heading and DON. However, there was a significant correlation between mean FHB index and FDK ($n = 192$, $r = 0.4024$, $P < 0.0001$), mean FHB index and DON levels ($n = 192$, $r = 0.6580$, $P < 0.0001$), and FDK and DON (n = 192, $r = 0.4995$, $P < 0.0001$) indicating positive associations among these parameters.

		FHB index (%)						
Entry[z]	Heading (Julian)	2 Jun	3 Jun	7 Jun	10 Jun	Mean[y]	FDK[x] (%)	DON[w] (ppm)
Everest	135.8	3.0	7.5	14.3	25.0	15.6	6.5	9.7
NE08659	143.8	0.8	6.0	13.3	29.8	16.3	14.0	15.4
SD10257-2	142.5	1.0	6.8	17.3	31.3	18.4	12.8	14.9
KS060106-M-11	137.0	2.0	4.5	18.8	35.0	19.4	16.3	16.5
NE10418	138.3	1.0	8.8	18.0	31.8	19.5	15.3	12.9
SD09140	144.8	0.5	5.5	16.5	36.5	19.5	15.0	15.5
KS060750-BE~7	135.8	1.8	8.0	19.3	32.5	19.9	6.0	10.0
SD08080	138.8	1.0	7.3	16.3	36.3	19.9	17.5	16.7
KS060750-BE~A	135.3	5.8	10.0	18.8	31.5	20.1	10.0	12.5
SD10027-2	142.0	0.5	7.8	17.8	35.5	20.3	13.8	17.1
NE07486	138.5	1.0	6.3	15.0	40.0	20.4	12.8	13.6
KS050173K-4	138.0	1.3	5.8	20.8	38.0	21.5	5.5	14.3
SD10066	142.3	1.0	9.3	18.8	38.0	22.0	12.5	15.0
SD08200	144.8	0.8	10.3	23.0	36.0	23.1	13.5	24.1
NE05548	141.0	1.3	6.3	23.0	40.5	23.3	15.0	16.7
NW03666	138.5	1.0	9.5	25.0	39.0	24.5	13.8	25.4
Karl 92	136.8	3.0	12.0	25.0	39.3	25.4	13.0	16.1
KS060377-M-11	142.0	3.3	11.8	23.0	43.0	25.9	7.5	17.4
SD09227	143.8	1.0	11.0	25.0	45.8	27.3	15.3	17.4
KS060750-BE~E	136.3	6.3	15.5	25.0	42.5	27.7	12.8	16.0
KS060638-BE~32	134.8	3.0	12.8	29.5	43.5	28.6	9.0	12.2

		FHB index (%)						
Entry[z]	Heading (Julian)	2 Jun	3 Jun	7 Jun	10 Jun	Mean[y]	FDK[x] (%)	DON[w] (ppm)
SD09118	143.0	3.3	9.5	29.5	46.8	28.6	18.8	23.4
NE08499	139.8	1.0	13.3	24.3	49.0	28.8	16.3	19.0
KS060638-BE~C	135.8	9.5	13.0	31.3	42.8	29.0	18.8	17.6
SD10026-2	143.0	0.8	12.3	25.5	49.3	29.0	10.0	15.1
SD09192	141.5	0.8	9.3	32.5	46.0	29.3	13.8	25.4
SD09113	144.3	0.8	10.8	27.5	51.3	29.8	16.3	20.6
SD07165	140.5	0.5	14.0	31.3	47.0	30.8	17.5	21.7
NE12637	142.3	1.5	16.3	30.5	46.5	31.1	12.8	16.9
KS060750-BE~20	135.8	13.3	15.3	30.8	50.0	32.0	11.3	15.2
Garrison	137.3	5.3	19.5	31.5	45.0	32.0	10.5	24.0
SD09138	142.3	1.0	13.0	32.0	55.0	33.3	18.8	24.6
KS060393-M-14	136.8	3.5	13.8	36.8	52.5	34.3	18.8	16.7
SD06158	145.0	0.5	14.0	40.0	51.5	35.2	18.8	25.7
KS061406-LN~37	137.5	4.3	19.8	35.5	51.3	35.5	16.3	23.6
NE07531	139.3	2.3	16.0	33.3	60.5	36.6	16.3	23.2
NE12503	141.8	1.0	15.3	36.8	58.0	36.7	15.3	27.4
KS060393-M-8	137.5	5.3	11.8	43.8	60.8	38.8	30.0	23.9
NE12539	140.3	1.3	20.5	43.8	67.5	43.9	10.8	21.2
NE12429	139.5	4.8	20.5	43.8	68.8	44.3	18.8	19.8
Protection CL	136.3	5.8	17.5	44.3	71.3	44.3	22.5	29.8
NE12668	138.5	3.0	19.3	45.3	73.8	46.1	28.8	32.1
SD08141	139.3	1.5	17.0	48.8	77.5	47.8	21.3	37.4
NE12408	139.5	5.0	21.5	49.5	75.0	48.7	22.5	26.8
NW07505	140.0	5.8	19.5	56.3	72.5	49.4	21.3	24.9
WB Stout	137.3	4.3	14.8	60.0	75.0	49.9	25.0	36.8
NE12689	137.0	7.0	24.3	55.8	77.5	52.5	26.3	24.1
Overley	135.3	15.0	26.5	61.3	77.5	55.1	30.0	37.6
Average	139.5	3.07	12.9	30.9	49.4	31.1	15.9	20.5
P value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD (*P*=0.05)	1.5	3.6	5.8	11.6	14.5	8.9	7.8	7.7

[z]Sorted by data in FHB index "Mean" column. Everest (MR) and Overley (S) were used as the moderately resistant and susceptible checks, respectively.
[y]Mean of 3 Jun, 7 Jun, and 10 Jun rating dates.
[x]*Fusarium*-damaged kernels.
[w]Deoxynivalenol concentration in ground grain samples.

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