

Reaction of Kansas, Nebraska, and South Dakota winter wheat accessions to *Fusarium* head blight (FHB), 2011.

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 30 Sep 10 (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/ft² 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 31 May, 2 Jun, 6 Jun, and 10 Jun. Plots were harvested with a combine on 29 Jun and grain sub-samples were rated for *Fusarium*-damaged kernels (FDK). Ground grain samples were 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 and the susceptible check Overley had a mean of 43% severity. All entries except six had severity ratings significantly lower than Overley. The cultivar Lyman had the lowest mean rating, although six other entries were statistically similar including the moderately resistant check cultivar Everest. Everest also had the lowest DON levels although 12 other entries were statistically similar. There were significant negative correlations between heading and mean FHB index ($n = 192$, $r = -0.4578$, $P < 0.0001$) and heading and yield ($n = 192$, $r = -0.6050$, $P < 0.0001$) indicating late maturing entries tended to have fewer symptoms and lower yields. There were also significant negative correlations between yield and FDK ($n = 192$, $r = -0.3376$, $P < 0.0001$) and yield and DON ($n = 192$, $r = -0.4064$, $P < 0.0001$) indicating that lower yielding entries tended to have high FDK and high DON. Finally, there were positive correlations between mean FHB index and FDK ($n = 192$, $r = 0.2141$, $P = 0.0029$), FHB index and DON ($n = 192$, $r = 0.1637$, $P = 0.0233$), and FDK and DON ($n = 192$, $r = 0.5826$, $P < 0.0001$) indicating positive associations among these disease parameters.

Entry ^z	FHB index (%)					Heading (Julian)	Yield (oz/plot)	FDK ^x (%)	DON ^{r,w} (ppm)
	31 May	2 Jun	6 Jun	10 Jun	Mean ^y				
Lyman	4.5	8.8	13.8	13.8	10.2	136.8	4.82	4.0	3.9
NE10619	3.5	5.3	18.8	17.5	11.3	134.0	4.73	5.5	6.3
NE09638	3.5	7.8	18.8	22.3	13.1	139.3	4.91	9.5	10.5
SD05085-1	4.0	8.0	17.5	22.8	13.1	130.8	4.61	6.0	5.9
SD08028	4.8	9.5	18.8	21.3	13.6	136.3	4.81	7.0	9.1
Everest (MR)	5.0	8.8	17.5	24.3	13.9	128.5	4.53	3.0	2.9
SD08200	2.0	5.5	21.3	28.5	14.3	141.3	4.98	9.0	13.2
SD05118-1 (Ideal)	3.5	8.5	22.5	30.8	16.3	142.3	5.02	10.8	18.3
SD08080	5.8	12.0	23.8	27.5	17.3	132.5	4.67	7.0	8.2
Karl 92	8.3	10.0	21.3	29.5	17.3	129.0	4.55	2.0	3.2
SD06158	2.0	9.5	26.3	35.0	18.2	141.5	4.99	12.8	15.9
09WesleyBC56	7.5	11.8	21.3	34.0	18.6	134.0	4.73	4.0	4.3
09WesleyBC21	7.0	14.3	21.3	34.3	19.2	134.8	4.75	5.3	6.1
KS031027NT-11	5.0	9.0	22.5	42.5	19.8	128.8	4.54	5.0	3.3
SD08133	7.3	14.3	25.0	32.5	19.8	136.5	4.81	10.0	10.6
NE09429	7.5	13.0	28.8	30.0	19.8	132.8	4.68	8.0	11.5
Overland	4.3	13.3	25.0	37.0	19.9	138.5	4.89	8.8	9.8
SD07184	8.8	17.5	23.8	30.8	20.2	132.5	4.67	6.0	14.3
SD05W030	6.8	15.5	27.5	32.5	20.6	133.5	4.71	6.0	9.5
09WesleyBC23	8.8	16.3	25.0	32.8	20.7	133.0	4.69	7.5	8.7
09WesleyBC40	8.5	13.0	25.0	36.5	20.8	132.8	4.68	5.0	4.6
NE10541	4.0	13.8	22.5	43.3	20.9	133.0	4.69	6.0	9.0

Entry ^z	FHB index (%)					Heading (Julian)	Yield (oz/plot)	FDK ^x (%)	DON ^w (ppm)
	31 May	2 Jun	6 Jun	10 Jun	Mean ^y				
SD07W053.....	4.0	10.3	26.3	43.8	21.1	138.0	4.87	10.5	12.4
NH10471.....	8.3	16.3	25.0	36.8	21.6	132.3	4.66	6.5	7.6
NW03666.....	7.8	16.3	28.8	36.3	22.3	132.0	4.66	6.0	10.8
09WesleyBC6.....	5.5	11.8	28.8	43.8	22.4	134.8	4.75	8.0	11.9
SD07165.....	8.8	16.3	28.8	37.0	22.7	132.3	4.66	7.5	10.7
09WesleyBC52.....	10.5	17.5	23.8	39.5	22.8	132.3	4.66	4.5	3.7
KS031009K-5.....	11.8	18.3	33.8	31.3	23.8	129.5	4.57	7.0	7.9
KS031009K-6.....	8.0	15.5	33.8	40.3	24.4	129.3	4.56	5.5	9.9
KS031009K-7.....	6.3	16.8	32.5	42.5	24.5	129.3	4.56	7.0	9.8
KS030792K-2.....	8.0	20.0	31.3	41.3	25.1	129.0	4.55	3.5	3.3
KS031009K-4.....	9.3	18.8	30.0	42.5	25.1	128.8	4.54	5.5	7.2
KS030815K-19.....	9.3	17.5	31.3	43.5	25.4	131.0	4.62	5.8	7.4
KS031027NT-6.....	7.8	18.8	35.0	40.5	25.5	128.5	4.53	4.0	4.1
NE01481.....	10.0	20.3	36.3	43.3	27.4	131.8	4.65	8.5	12.6
NI09706.....	15.0	23.3	28.8	48.8	28.9	131.0	4.62	8.5	7.8
KS030644NT-16.....	13.0	24.3	36.3	43.0	29.1	129.0	4.55	13.3	9.5
SD03197-1-1.....	15.0	30.5	33.8	49.0	32.1	136.8	4.82	7.5	10.1
SD06W160-2.....	11.3	25.0	45.0	58.3	34.9	134.8	4.75	10.3	11.3
KS030887K-4.....	15.0	31.3	46.3	48.5	35.3	129.3	4.56	9.8	13.5
SD08086.....	16.8	28.8	46.3	60.8	38.1	132.8	4.68	7.5	8.5
KS030607K-11.....	18.8	38.8	43.8	55.8	39.3	129.8	4.58	10.3	10.3
KS030815K-13.....	20.0	30.0	56.3	53.8	40.0	128.3	4.52	4.0	3.7
KS030607K-8.....	18.8	36.3	45.0	62.0	40.5	129.8	4.58	7.5	11.3
KS031011K-2.....	21.3	38.8	40.0	66.3	41.6	129.0	4.55	10.3	11.7
Overley (S).....	25.0	37.5	42.5	67.0	43.0	128.5	4.53	7.5	9.4
KS030887K-6.....	23.3	41.3	62.5	60.8	46.9	129.3	4.56	10.3	10.0
Mean.....	9.4	18.0	30.0	39.5	24.2	132.7	4.68	7.17	8.86
LSD ($P=0.05$).....	5.08	6.74	7.40	9.24	5.10	1.63	0.06	4.02	3.62
R^2	0.77	0.84	0.84	0.83	0.89	0.93	0.85	0.51	0.73
CV.....	38.8	26.8	17.7	16.8	15.1	0.88	20.4	40.1	29.2

^zSorted by data in FHB index "Mean" column. Everest (MR) and Overley (S) were used as the moderately resistant and susceptible checks, respectively.

^yMean of all rating dates.

^x*Fusarium*-damaged kernels.

^wDeoxynivalenol.

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