

Reaction of winter wheat accessions containing *Fhb3* and selected cultivars to Fusarium head blight, 2009.

A field experiment was conducted in Chase silty clay loam (pH=6.5) near Manhattan, KS. Experimental design was a randomized complete block with 24 entries. Entries beginning with "08" were from a wheat-*Leymus racemosus* translocation (chromosome T7AL-7Lr#1S) backcrossed into the cultivars Overley and Jagger. These entries potentially carry the gene *Fhb3*, located on T7AL-7Lr#1S, for resistance to FHB. There were four replications and plots were single rows 7.5 ft long spaced 20 in. apart. Seed was sown 3 Oct 08 (1 bu/A). Air-dried corn kernels colonized by an aggressive isolate 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 for 3 min/hr from 9:00 pm until 6:00 am. For each plot, the date of 50% headed and visual estimations of percent symptomatic spikelets (FHB index) were recorded on 1 Jun, 3 Jun, 5 Jun, and 8 Jun. Plots were harvested with a combine on 8 Jul and grain sub-samples 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 were subjected to analysis of variance and Fisher's least significant differences (LSD, $P = 0.05$) were determined for each rating date, the mean of all rating dates, heading date, yields, FDK, and DON levels in grain. Correlations among parameters were also calculated.

Severe FHB developed at the site. The moderately-resistant check cultivar Truman had the lowest mean FHB index, although Hondo and Ike were statistically similar. All of the translocation lines except 08-183 had significantly lower mean disease ratings compared to their susceptible parent Overley. Unfortunately, the other backcross parent Jagger was not included in the test; however, three of the translocation lines (08-193, 08-189, and 08-184) had significantly lower ratings than Jagalene which is known to be identical to Jagger in its reaction to FHB. It appears that *Fhb3* increased resistance in these entries. Similarly, the same three translocation entries had significantly lower DON levels than Overley and Jagalene and were statistically similar to moderately-resistant Truman. There was a significant negative correlation between heading date and mean FHB index ($n = 96$, $r = -0.5144$, $P < 0.0001$) indicating that later maturing entries tended to have less symptoms. There was also a negative correlation between mean FHB index and yield ($n = 96$, $r = -0.3654$, $P = 0.0003$) indicating that the disease significantly reduced yield. Additionally, there was a negative correlation between yield and DON ($n = 96$, $r = -0.3628$, $P = 0.0003$) indicating that lower yielding entries tended to have high DON levels. There were significant positive correlations between mean FHB index and FDK ($n = 96$, $r = 0.4945$, $P < 0.0001$), mean FHB index and DON ($n = 96$, $r = 0.3247$, $P = 0.0012$), and FDK and DON ($n = 96$, $r = 0.4103$, $P < 0.0001$) indicating positive associations among those disease parameters.

Entry ^z	FHB index (%)				Mean index ^y (1+3+5 Jun)	Heading (Julian)	Yield (oz/plot)	FDK ^x (%)	DON ^w (ppm)
	1 Jun	3 Jun	5 Jun	8 Jun					
Truman	1.5	5.5	5.3	17.3	4.1	135.0	10.5	25.0	12.6
Hondo	3.8	6.3	11.5	19.5	7.2	136.3	5.3	47.5	18.2
Ike.....	5.3	9.8	11.3	Mature	8.8	130.0	8.8	50.0	8.9
Heyne.....	7.3	7.5	18.3	40.8	11.0	131.0	7.5	21.3	13.2
Overland	9.3	11.0	15.0	35.8	11.8	136.3	2.9	76.3	24.7
08-193.....	13.0	8.3	16.0	Mature	12.4	128.0	3.5	66.3	10.2
Winterhawk.....	7.0	14.3	16.8	57.5	12.7	128.3	9.4	40.0	10.1
08-189.....	11.3	14.3	16.8	46.7	14.1	129.0	2.4	82.5	10.6
Hatcher	11.3	17.8	21.3	52.5	16.8	135.3	2.1	90.0	25.3
08-184.....	14.3	12.5	23.8	Mature	16.8	130.0	4.1	68.8	12.6
TAM 111	8.3	15.5	27.0	56.3	16.9	132.5	3.7	75.0	20.5
T81	14.5	17.8	26.3	56.7	19.5	129.8	6.3	55.0	19.8
08-194.....	13.8	18.3	27.5	63.8	19.8	131.3	1.1	85.0	18.5
Aspen.....	15.8	18.8	25.5	Mature	20.0	126.5	10.3	36.3	10.3
08-190.....	16.8	16.0	27.5	47.5	20.1	129.3	1.9	81.3	15.0
Shocker	15.0	21.5	27.5	Mature	21.3	127.8	6.0	81.3	19.1
08-191.....	18.8	17.5	31.3	75.0	22.5	128.0	3.7	76.3	11.7
08-181.....	17.8	19.3	31.3	65.8	22.8	129.3	3.4	80.0	15.7
Jagalene	10.8	31.0	32.5	70.0	24.8	129.8	5.7	81.3	22.8
08-196.....	19.8	28.0	27.5	67.0	25.1	125.5	2.6	87.5	17.8

Entry ^z	FHB index (%)				Mean index ^y (1+3+5 Jun)	Heading (Julian)	Yield (oz/plot)	FDK ^x (%)	DON ^w (ppm)
	1 Jun	3 Jun	5 Jun	8 Jun					
Protection CL.....	20.5	22.3	35.0	67.5	25.9	128.0	5.8	88.8	17.9
08-192.....	19.0	24.5	40.0	72.5	27.8	128.3	1.5	90.0	15.7
Overlay	28.3	26.5	47.5	72.5	34.1	127.0	7.3	72.5	22.2
08-183.....	25.0	33.8	45.0	73.8	34.6	127.0	1.1	87.5	19.7
Mean.....	13.7	17.4	25.3	55.7	18.8	130.0	4.9	68.5	16.4
LSD (<i>P</i> =0.05).....	5.7	8.0	9.8	8.8	6.1	1.8	1.7	18.0	6.2
R ²	0.80	0.75	0.79	0.95	0.84	0.89	0.89	0.79	0.67
CV	29.59	32.59	27.49	9.05	23.19	0.97	24.3	18.6	26.9

^zSorted by data in "Mean index" column.

^yAverage of ratings on 1 Jun, 3 Jun, and 5 Jun.

^xFusarium damaged kernels.

^wDeoxynivalenol.

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