

WHEAT (*Triticum aestivum* ‘multiple cultivars’)
Fusarium head blight; *Fusarium graminearum*

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Reaction of Kansas Interstate Nursery winter wheat accessions to Fusarium head blight, 2021.

An experiment was established at the Kansas State University, Rocky Ford Research Station in Manhattan, KS. Soil was a Chase silty clay loam (pH = 6.5). The experiment was planted in a randomized complete block design with four replications of 35 entries. Single row plots were seeded at a rate of 67.25 kg/ha into 2.3-m long with 0.51-m row spacing on 07 Oct 2020. Corn kernel inoculum was grown with two aggressive *Fusarium graminearum* isolates (GZ-3639, Pt-1-04) and air-dried. Inoculum was spread onto the plots at a rate of 53 g/m² on 02 Apr, 77 Apr, and 02 May 2021. During anthesis, the nursery was mist irrigated to improve *F. graminearum* conditions for 12 minutes every 4 hours throughout the night for a total of 48 minutes per night. Heading dates were recorded when plots reached 50% headed tillers. Type I (points of infection) and Type II (infection site spread) Fusarium head blight (FHB) index was rated on 24 May, 26 May, 28 May, 30 May, 01 Jun, 03 Jun, 05 Jun, and 07 Jun 2021 by determining the percent of symptomatic spikelets. Plots were harvested on 05 Jul 2021. The ratio of Fusarium damaged kernels (FDK) was recorded after cleaning. Grain samples were evaluated for deoxynivalenol (DON) concentration. Area under the disease progress stairs (AUDPS) and the least significant difference (LSD) ($\alpha=0.05$) were calculated using the R package ‘Agricolae’ version 1.3-3 (Mendiburu, 2020). Data were analyzed with the ‘aov’ function (R Core Team, 2019).

Moderate field temperatures allowed a long grain-fill period which allowed more time for disease development than typical seasons. This allowed ample time for disease progression on the wheat. The early susceptible check ‘Overley’ had a total resistance AUDPS rating of 1049.5, which was only surpassed by the line ‘KS120154k-5’ with a rating of 1139.5. However, four lines (‘KS18H110-3’, ‘KS19H10’, ‘KS120215K-6’, and ‘KS16DH0002-12’) failed to statistically outperform ‘Overley’. The cultivar with the lowest total resistance AUDPS rating was ‘Everest’ with a rating of 493.5. The lines ‘WB4269’, ‘KS19H79’, ‘Karl92’, and ‘KS15DH0055-11’ were not statistically different from ‘Everest’. Type I and Type II FHB observations were highly correlated however some variation existed.

Variety	Heading Date ^z	Plot Damage Severity (%)			Type I AUDPS ^y	Type II AUDPS	Total Resistance AUDPS
		Early Season ^w	Middle Season ^w	Late Season ^w			
Everest	122	2.6	14.7	65.8	890	652.5	493.5
Karl92	122	4.6	18.2	78.3	975	762.5	597
KS120154K-5	122.5	31.0	73.2	96.1	1492.5	1192.5	1139.5
KS120215K-6	124.5	23.6	59.8	88.8	1472.5	1029.5	985.5
KS120494M-1	125.25	12.8	43.0	83.8	1315	900	812
KS13DH0041-35	123	5.4	29.2	71.8	1075	777.5	627.5
KS14HD286	127	11.5	41.8	79.5	1330	855	774
KS15DH0055-11	125.5	7.0	27.1	68.2	1057.5	761.5	599.5
KS16DH0002-12	123.25	23.6	60.8	91.6	1490	1047.5	1008.5
KS16DH0004-30	128	11.1	41.8	84.8	1225	935	804
KS16DH0006-17	123	6.6	26.5	72.1	1097.5	752.5	618
KS16DH0008-32	123.5	8.3	42.2	82.1	1237.5	880	778.5
KS16DH0010-17	123.25	7.8	37.0	87.3	1197.5	887.5	777
KS16DH0011-12	124	10.8	44.2	85.5	1277.5	917.5	821
KS18EVACK-327	124	14.5	48.7	82.2	1330	940	843
KS18EVACM-11	122	8.5	42.0	88.2	1305	877.5	815
KS18EVACM-34	124	13.3	33.3	77.8	1272.5	827.5	719.5
KS18H110-3	127	13.9	58.0	88.0	1335	1022	931.5
KS18H111-3	125.5	7.8	36.3	78.8	1140	867.5	721
KS18H124-6	127.75	6.9	28.6	74.3	1035	832.5	644.5
KS18H19-1	126.75	16.4	50.3	84.7	1362.5	965	875.5
KS18H19-6	126	20.9	46.8	83.5	1335	985	865
KS19H10	127.25	16.9	57.0	90.6	1337.5	1055	953
KS19H21	126.75	14.5	37.9	81.1	1265	895	772
KS19H68	127	15.3	50.6	90.9	1267.5	1037.5	910
KS19H69	126.75	10.6	39.7	80.8	1237.5	875	765.5
KS19H74	125.5	7.3	31.2	71.4	1110	792.5	644.5
KS19H79	122.25	2.9	22.9	71.4	975	740	577.5
KS19HW39	127.75	7.9	34.4	82.1	1117.5	895	730.5
KS19HW84	125.25	11.4	30.8	76.2	1165	832.5	687.5
LCS Chrome	126.5	4.6	29.6	72.9	1032.5	812.5	633.5
NUSAKA15-3	124	13.0	35.3	75.6	1275	817.5	717.5
Overley	121.5	23.0	65.6	94.0	1427.5	1117.5	1049.5
Rock Star	125.75	14.1	42.3	77.8	1292.5	880	777.5
WB4269	121	3.8	18.3	72.7	922.5	740	561
p-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
cv	0.77	31.17	19.25	9.85	6.59	8.46	11.42
LSD ^x (P = 0.05)	1.35	5.17	10.79	11.17	112.77	105.68	123.68

^zDays from January 1

^yArea Under the Disease Progress Stairs

^xData were analyzed with R Core Team (2019). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>. Least significant difference (LSD) at P = 0.05 were calculated using the Agricolae package.

^wRatings binned: Early season 24 May, 26 May, middle season 28 May, 30 May, 01 Jun, late season 3 Jun, 5 Jun, 7 Jun.