

Wheat (*Triticum aestivum*)  
Fusarium Head Blight; *Fusarium graminearum*

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### **Disease Severity of Selected Southern Wheat Cultivars to Fusarium Head Blight (FHB), 2023.**

The experiment was conducted at Kansas State University Rocky Ford Research Station, Manhattan, Kansas. The field soil type was Chase silty clay loam (pH = 6.5). A randomized complete block design was used with four replicates of 50 wheat cultivars (entries) including Emerson, Karl92, and Overly checks. Experimental plots were ten rows 0.51 m wide and 2.286 m long and were seeded on October 7<sup>th</sup>. Corn kernel inoculum was prepared using a native aggressive *Fusarium graminearum* isolate GZ-3639 and air-dried. Sterile corn kernels were used for inoculum production. Field application of the inoculum was done in early spring April 15, May 1 and May 15 at a rate of 53g/m<sup>2</sup>. Moisture conditions on the nursery necessary for *Fusarium graminearum* perithecia, spore development, and infection were maintained with mist irrigation throughout the nursery for about 15 minutes at 4-hour intervals during flowering. Heading dates for entries were taken at 50% headed tillers. The incidence of symptomatic wheat plants from natural infection of Fusarium head blight (FHB) was visually estimated for each plot during the flowering period. Sterile corn kernels were used for inoculum production. The FHB incidence (%) were rated every other day namely May 26<sup>th</sup>, May 28<sup>th</sup>, May 30<sup>th</sup>, June 1<sup>st</sup>, June 3<sup>rd</sup>, June 5<sup>th</sup>, June 7<sup>th</sup>, and June 9<sup>th</sup> by rating the percentage of infected spikelets with symptomatic head blight. The area under the disease progressive stairs (AUDPS) (quantitative intensity of FHB) was calculated for all entries and the least significant differences (LSD) (p=0.05) were determined using ‘Agricolae’ R package tool version 1.3-3 (R-Development Core Team). Plots for various entries were harvested on July 4<sup>th</sup>, 2023, and the Fusarium damaged kernel (FDK) were estimated (in percentage) through visual inspection after cleaning.

Pathogen infectivity across the nursery was due to optimal conditions necessary for pathogenicity. The early susceptible check Overly had the highest disease severity with an AUDPS (quantitative disease intensity/severity) of 587.5. Entry OK16103083 had the lowest AUDPS of 211, outperforming TX15M8456-19AZ504 (AUDPS 537) and Everest (AUDPS of 260) with the lowest concentrations of DON 5.60 PPM and 7.13 PPM respectively. TX15M8456-19AZ504 outperformed the moderately resistant entry Everest and other entries with lesser concentration mycotoxin DON levels but relatively higher AUDPS. The individual incidence at different dates

contributed to the total area under the disease progression curve and Fusarium damaged kernel (FDK). Average FDK estimations range between 2.75 % (for entry Everest) to 58.75 % (for entry OK20708) and correlate with evaluated AUDPS and DON at 0.21 and 0.78 respectively.

Fusarium head blight					
Entry	Heading	Average FHB (%) *	FDK	DON	AUDPS**
OK16103083	131.50	13.19	17.00	19.57	211.00
OK Corral	131.25	31.59	31.25	17.23	505.50
OK18217-19HR-4	131.75	16.31	30.50	23.45	261.00
OK19225	131.67	20.54	32.33	32.57	328.67
OK20418-7C21	131.75	23.34	21.25	17.90	373.50
OK16107133-19HR-3	130.75	14.00	26.50	13.75	224.00
OK16107133-19HR-4	131.50	18.50	19.25	13.85	296.00
OK20708	129.00	27.25	58.75	27.38	436.00
OK21538	131.00	21.06	23.25	21.93	337.00
OK198417C	131.25	20.22	38.75	25.75	323.50
OK20925WF	129.75	15.97	2.75	11.00	255.50
OK19515-20HR-2	134.25	15.31	41.00	32.45	245.00
OK2189176WF	134.50	23.47	51.25	32.25	375.50
OK2189178WF	134.50	20.66	23.00	14.65	330.50
OK21227	130.50	35.72	27.00	10.85	571.50
TX19A001030	131.25	16.78	22.25	15.03	268.50
TX15A001482-19AZ16	134.00	24.06	38.75	28.85	385.00
TX18DH129	133.00	26.63	55.00	30.65	426.00
TX18DH266	130.75	25.16	26.50	17.33	402.50
TX18DH287	129.50	21.88	26.25	14.53	350.00
TX18DH313	131.50	21.06	20.33	12.93	337.00
TX15M8456-19AZ435	132.00	27.97	48.75	20.03	447.50
TX15M8456-19AZ504	126.50	33.56	26.25	5.60	537.00
TX19M3183	129.50	24.81	28.75	10.53	397.00
TX14A001035	130.00	21.97	18.75	14.20	351.50
TX14V70214	129.50	18.19	9.50	11.85	291.00
TX15M8024	130.50	28.09	35.75	19.75	449.50
TX16M9216	133.50	19.84	45.00	23.80	317.50
TX18A001119	131.00	20.06	14.25	13.83	321.00
TX18A001132	128.25	21.16	7.25	8.58	338.50
Everest	126.75	16.25	2.75	7.13	260.00
Karl92	127.50	13.47	6.25	11.68	215.50
Overly	126.50	36.72	10.00	12.30	587.50
AP Roadrunner	133.00	15.84	58.33	28.37	253.50
AP Bigfoot	128.75	22.75	22.75	13.50	364.00

Average	130.80	22.10	27.64	18.14	353.55
pval	<0.001	<0.001	<0.001	<0.001	<0.001
LSD	1.14	22.58	54.50	33.81	22.58

\* Percentage of wheat plants showing Fusarium head blight symptoms

\*\* Area Under Disease Progress Steps (AUDPS)