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

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Disease Severity of Selected Northern 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 7th. 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^2. 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 28th, May 30th, June 3rd, June 5th, June 7th, June 9^{th,} and June 12th 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^{th,} 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 of 1100.56. Entry Emerson had the lowest AUDPS (quantitative disease intensity/severity) of 170.94,

outperforming MTFH23308 (AUDPS of 267.44) with the lowest concentration of DON 8.68 PPM. MTFH23308 and 22Nord-171 outperformed the moderately resistant entry Emerson with lesser 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 17.75 % (for entry 22Nord-171) to 73.75 % (for the check SD20D064-3) and correlate with evaluated AUDPS and DON at 0.26 and 0.52 respectively. DON and AUDPS correlate stood at 0.35.

		Fusarium head blight			
Entry	Heading	Average FHB	FDK	DON	AUDPS**
19Nord-124	140.75	25.04	37.50	13.20	439.88
20Nord-138	144.00	22.57	48.33	11.13	387.13
21Nord-155	143.00	14.64	27.50	11.80	253.63
21Nord-156	143.00	19.07	45.75	16.00	330.56
21Nord-161	137.00	31.11	56.25	41.15	531.38
22Nord-169	142.75	10.25	35.25	18.45	182.06
22Nord-170	144.00	15.00	37.50	27.53	272.94
22Nord-171	144.50	15.50	17.75	9.58	272.63
22Nord-172	144.75	13.43	31.50	18.23	238.44
22Nord-173	143.50	30.43	57.50	24.93	523.38
22Nord-174	129.67	45.86	23.33	15.10	795.67
22Nord-175	144.25	16.68	27.50	19.38	296.13
22Nord-176	142.75	21.00	42.50	23.58	366.31
22Nord-177	139.25	24.57	53.75	21.45	425.63
22Nord-178	141.25	13.86	18.75	14.80	248.69
SD18B016-5	138.25	24.57	55.00	32.65	424.13
SD18B025-8	140.00	26.00	40.00	28.68	449.44
SD18B055-2	130.75	47.89	56.25	25.58	832.81
SD18B072-2	134.00	41.50	51.25	18.38	718.25
SD19B019-2	136.00	38.32	53.75	16.33	648.50
SD19B033-2	137.75	32.39	38.75	21.70	556.50
SD19B108-3	139.75	33.82	65.00	28.00	579.75
SD19B164-3	137.00	26.75	52.50	28.20	469.25
SD20B088-2	137.75	33.93	38.75	18.23	572.75
SD20D100-9	129.75	46.64	32.75	19.28	806.19
SD20C031-1	141.50	50.75	52.50	27.18	867.44
SD20D009-9	145.00	22.29	51.67	19.67	383.56
SD20D063-2W	142.25	34.39	50.00	32.58	587.25
SD20D064-3	133.00	42.64	73.75	71.50	728.75
SD20D108-6	135.33	50.19	43.33	19.17	859.58
MTFH23301	145.25	16.25	59.00	15.30	286.88
MTFH23302	143.25	21.93	57.50	28.98	385.88

MTFH23303	143.75	22.21	20.00	15.60	383.63
MTFH23304	144.50	14.46	42.50	22.70	255.44
MTFH23305	145.75	16.71	57.50	14.20	297.38
MTFH23306	140.75	16.82	46.25	22.40	295.19
MTFH23307	143.25	19.89	70.00	15.95	347.81
MTFH23308	145.75	15.43	45.00	8.68	267.44
MTFH23309	111.50	21.82	50.00	16.13	376.06
MTFH23310	146.75	16.93	42.50	10.88	306.81
MTFH2290	142.50	35.89	52.50	25.40	610.00
MTFH2292	142.50	28.79	40.00	26.03	496.06
MTCL2010	144.00	16.07	31.25	14.10	277.56
MT2019	145.00	17.11	51.25	15.13	300.44
MTS2068	141.50	23.43	52.50	24.93	403.56
Emerson	145.25	9.57	32.50	9.75	170.94
Karl92	129.75	40.25	31.25	17.55	689.94
Overly	128.50	63.61	53.75	22.93	1100.56
Flourish	142.75	28.21	51.25	34.68	488.13
LCS Steel AX	141.00	35.71	41.67	20.17	593.33
Average	139.92	27.04	44.88	21.50	467.63
pval	<0.05	<0.001	<0.001	<0.001	<0.001
LSD	7.01	20.21	32.96	32.97	19.85

* Percentage of wheat plants showing Fusarium head blight symptoms

** Area Under Disease Progress Steps (AUDPS)

Deoxynivalenol (DON)