

**Screening Wheat Varieties For Resistance To Fusarium  
Head Blight (Head Scab) In Kentucky**  
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**Objectives:**

1. To identify scab resistance in adapted varieties and breeding lines.
2. To develop field-based procedures for resistance screening that can be incorporated into our breeding program.

**Methods:**

Entries in the 1998 Uniform Winter Scab Nursery along with a number of advanced breeding lines (Tables 1, 2) were planted in a randomized complete block design with three replications near Lexington, KY. Experimental units were small plots (20 ft<sup>2</sup>) with 6 rows planted in 7" rows using a Hege headrow planter. The planting date was 21 Oct. 1997. The previous crop was corn (Zea mays L.) and the seedbed had been chisel plowed and disked. Input applications were made according to UK recommendations.

Our inoculation procedure was as follows: Mason jars containing 500 g of corn seed were inoculated with the head scab fungus (Fusarium graminearum). About 10 days before heading, we spread 225 g of corn/plot among the wheat rows. Beginning just prior to flowering and continuing through early grain fill, the plots were mist-irrigated for approximately 1 hour morning and evening. Symptoms were measured at approximately 19 days after flowering. Incidence of scab in 4 row-feet (two 2' rows) was estimated by recording the number of heads showing typical scab symptoms. Severity was estimated by counting scabby florets on 5 random heads per plot. The two 2' rows were harvested with a sickle, total head number was counted, and grain was threshed in a single head thresher to estimate % scabby seed. Remaining plots were harvested with a Hege plot combine to measure grain yield and test weight.

**Results:**

Scab symptoms and other data are presented in the Tables 1-3.

**Conclusions:**

At this stage in our research our only conclusions are that there appear to be differences in resistance to head scab among adapted varieties and breeding lines in our program. At this point, under heavy disease pressure from inoculation, none of the varieties or breeding lines looks very good in terms of resistance. We don't yet know whether our disease pressure is too heavy to prevent us from seeing moderate levels of resistance. One way to answer this question is to establish a baseline level of natural infection with which we could compare our inoculated plots (Table 3). The low correlation ( $r=0.22$ ) between inoculated and control plots for % scabby seed indicates that disease levels under inoculation may be higher than under natural infection. We will focus on this problem in the coming year.

Table 1 Results of the 1998 Winter Uniform Scab Nursery at Lexington, KY.

Entry	Incidence % heads	Severity % florets	Index	Scabby Seed %	Yield bu/a	Test Wt. lb/bu
Patterson	72.6	90	65.34	25.14	38.1	44.8
Freedom	58.4	30	17.52	32.84	40.0	44.7
P2545	68	60	40.8	50.54	36.1	42.5
Ernie	69.5	70	48.65	34.25	34.2	46.3
M94-1048	63.4	50	31.7	26.1	42.5	49.1
OH618	31.2	10	3.12	14.55	43.7	49.0
OH552	52.7	15	7.905	18.79	48.0	50.3
OH536	67.6	12	8.112	30.4	36.0	46.9
OH544	49.9	15	7.485	19.08	34.4	47.6
Wakefield	72.6	50	36.3	21.29	30.4	45.6
VA96-54-216	77.6	90	69.84	45.72	26.2	46.2
VA96-54-429	73.1	45	32.895	19.05	30.4	51.3
VA96-54-234	77.5	50	38.75	42.64	34.5	45.9
IL94-1909	55.2	15	8.28	19.73	46.1	51.2
IL94-1549	52.9	12	6.348	36	27.3	48.9
92823A1-1-4-4-5	45.3	45	20.385	17.8	39.2	47.2
92807A1-1-5-1-1	84.4	*	*	24.4	40.9	46.7
89118RC1-X-9-3-3	59.8	12	7.176	12.92	37.3	51.7
86958RC4-2-1-10	72.4	75	54.3	30.04	35.7	47.0
88288CA-6-2-8	70.9	35	24.815	25.85	33.1	47.1
92829A1-1-1-3-3	30.1	30	9.03	8.74	36.5	48.1
KS85W663-11-6-42	45.1	15	6.765	13.9	31.6	50.9
Geneva	65.3	57	37.221	34.05	21.7	43.2
Cayuga	56.6	17	9.622	20.09	19.7	45.5
NY85019-7117	56.1	35	19.635	36.73	27.7	43.4
NY87048W-7387	37.9	30	11.37	17.17	18.2	46.9
NY87047W-7405	79.9	90	71.91	27.63	24.9	42.9
NY64/H//H-7133	48.9	35	17.115	24.46	32.9	44.3
Agripro Foster	61.3	57	34.941	22.96	22.4	45.6
D5330	53.7	12	6.444	18.73	26.7	43.8
D4045	36.3	56	20.328	40.96	31.0	42.9
DC005	44	15	6.6	21.14	29.7	46.6
Ramrod	52.1	50	26.05	22.21	36.0	43.1
Mean	58.9	40.0	24.4	25.9	33.12	46.6
CV (%)	28.5	30.4	45.1	12.6	19.0	3.9
LSD (0.05)	29.4	20.6	19.7	30	9.8	3.6

Table 2 Evaluation of SRW Wheat Breeding Lines for Scab Resistance, Lexington, KY, 1998.

Entry	Incidence % heads	Severity % florets	Index	Scabby Seed %	Yield bu/a	Test Wt. lb/bu
KY89C-895-14	36.41	23	8.37	20.1	29.3	47.9
KY89C-225-6	49.90	30	14.97	9.1	32.5	48.6
KY89C-888-29	51.60	30	15.48	40.6	25.4	43.8
KY89C-888-32	53.44	23	12.29	36.0	34.4	45.8
KY89C-744-19	54.06	23	12.43	42.9	37.2	46.2
KY89C-744-44	57.93	20	11.59	28.1	32.4	45.8
KY89C-225-11	58.61	40	23.44	27.3	31.1	45.8
KY89C-753-48	60.24	40	24.09	62.2	28.7	43.8
KY89C-744-57	61.34	33	20.24	46.8	33.8	45.0
KY89C-804-37	62.10	36	22.36	37.5	32.6	46.1
KY89C-007-3	62.87	30	18.86	24.6	37.2	48.0
KY89C-888-14	66.84	40	26.74	51.0	22.8	44.1
KY89C-225-5	67.28	30	20.18	44.1	37.4	45.8
KY89C-804-14	67.33	43	28.95	56.4	25.8	44.1
KY89C-752-21	71.86	26	18.68	57.1	31.6	43.2
KY89C-804-18	72.96	46	33.56	32.1	21.7	43.3
KY89C-873-43	72.97	30	21.89	42.9	23.5	49.1
KY89C-873-39	72.99	30	21.90	36.3	19.8	48.0
KY89C-720-10	73.12	46	33.63	53.3	26.4	42.3
KY89C-744-40	75.14	30	22.54	49.7	35.8	45.6
KY89C-804-23	75.65	40	30.26	61.7	28.1	43.1
KY89C-804-55	75.86	50	37.93	56.4	33.1	37.0
KY89C-804-11	84.48	33	27.88	47.4	26.9	46.6
Mean	64.56	33.57	22.10	41.90	29.89	45.18
CV (%)	26.2	28.6	39.1	26.8	19.9	3.4
LSD (0.05)	27.3	25.8	23.7	17.0	9.4	3.1

Table 3 Uniform Winter Scab Nursery Under Treated and Control Conditions, Lexington, KY, 1998.

Entry	Treated <sup>1</sup> Scabby Kernels %	Control Scabby Kernels %	Difference Scabby Kernels %
Patterson	25.1	10.1	15.0
Freedom	32.8	14.5	18.3
P2545	50.5	32.5	18.0
Ernie	34.2	19.2	15.0
M94-1048	26.1	4.0	22.1
OH618	14.5	18.1	-3.5
OH552	18.8	9.9	8.9
OH536	30.4	12.6	17.8
OH544	19.1	28.1	-9.0
Wakefield	21.3	11.8	9.5
VA96-54-216	45.7	9.9	35.8
Roane	19.0	18.8	0.2
VA96-54-234	42.6	24.6	18.3
IL94-1909	19.7	3.9	15.8
IL94-1549	36.0	4.8	31.2
92823A1-1-4-4-5	17.8	20.8	-3.0
92807A1-1-5-1-1	24.4	21.5	2.9
89118RC1-X-9-3-3	12.9	6.4	6.5
86958RC4-2-1-10	30.0	14.3	15.7
88288CA-6-2-8	25.8	29.2	-3.3
92829A1-1-1-3-3	8.74	6.6	2.1
KS85W663-11-6-42	13.9	7.2	6.7
Geneva	34.0	18.5	15.5
Cayuga	20.0	46.7	-26.6
NY85019-7117	36.7	12.2	24.5
NY87048W-7387	17.2	1.37	15.8
NY87047W-7405	27.6	10.0	17.6
NY64/H//H-7133	24.4	19.5	4.9
Agripro Foster	22.9	5.5	17.4
D5330	18.7	4.8	13.9
D4045	40.9	21.5	19.4
DC005	21.1	27.9	-6.7
Ramrod	22.2	22.4	-0.2
Mean	25.9	15.7	10.2

<sup>1</sup>Inoculated with scabby corn and mist irrigated.