

SCREENING FOR SCAB RESISTANCE IN SOFT RED WINTER WHEAT

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In 2005, Kentucky producers experienced exceptional yields resulting from an extremely favorable environment for wheat production and essentially no scab pressure. Although there was very little natural disease development throughout the state, the irrigated scab nursery at Lexington, KY produced enough disease pressure that breeding lines could be screened for resistance. The difficulty in controlling inoculum level in the irrigated nursery in previous years prompted the addition of an alternative screening method: non-irrigated hill plots inoculated with a spore suspension.

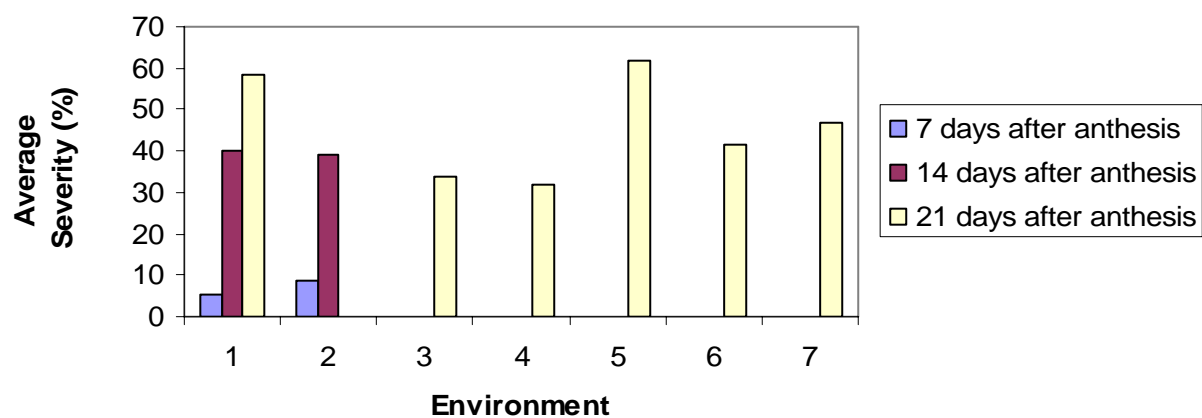
Advanced breeding lines were screened for resistance in the irrigated scab nursery by measuring scab severity at 21 days after flowering. Selected breeding lines from the irrigated scab nursery were also screened in the non-irrigated hill plots. Ten seeds of each line were planted into two non-irrigated hill plots at Lexington, KY. One hill plot was sprayed at flowering with a spore suspension until runoff and bagged for 72 hours. The second hill was not sprayed with a spore suspension and was not bagged. Twenty-one days after inoculation the hills were rated for disease severity.

Disease severity in the irrigated nursery ranged from 6 to 93%; the average of the entire nursery was 40%. This is significantly different from 2004 where resistant and susceptible breeding lines could not be distinguished, the range in disease severity for lines was 17 to 96% and the average severity of the entire nursery was 47%. Also, the breeding lines included in both the irrigated nursery

and non-irrigated hill plots had significant differences in average severity. The non-irrigated inoculated hill plots produced much higher severity (62%) than the non-inoculated hill plots (42%) and the irrigated scab nursery (46%) (Table 1).

In 2004, non-irrigated plots of the variety Clark were also screened for scab resistance to determine if non-irrigated plots could produce meaningful data. The plots were read for scab symptoms 7 and 14 days after flowering at Lexington and Woodford County, KY locations. Plots at Lexington were also read at 21 days after flowering. The Woodford County location was not read 21 days after flowering because of labor demands at Lexington at that time. Results from spray-inoculated heads of selected breeding lines in the hill plots mirror the results from 2004; severity of the inoculated non-irrigated plots was higher than the irrigated scab nursery (Figure 1). Although the data support our thoughts that non-irrigated plots could produce scab symptoms, our goal was decreased average severity rather than increased severity. Therefore, next year we will inoculate non-irrigated plots with less fungus and without bagging after inoculation to determine if lower severity can be produced in the non-irrigated plots than in the irrigated scab nursery. This could be useful in testing advanced breeding lines in different locations across Kentucky or in years in which the irrigated nursery produces such high levels of inoculum that it is impossible to separate resistant and susceptible lines. Also, by testing lines in multiple environments, a better estimation of resistance can be made.

Figure 1. Average Severity Across Environments for Irrigated and Non-Irrigated Inoculations



Environment	Description
1	2004 Point Inoculation of Clark at Lexington, KY
2	2004 Point Inoculation of Clark at Woodford County, KY
3	2004 Irrigated Scab Nursery of Clark at Lexington, KY
4	2004 Irrigated Scab Nursery of Clark at Princeton, KY
5	2005 Inoculated Non-Irrigated Plots of Selected Breeding Lines at Lexington, KY
6	2005 Non-Inoculated Non-Irrigated Plots of Selected Breeding Lines at Lexington, KY
7	2005 Irrigated Scab Nursery of Selected Breeding Lines at Lexington, KY

Table 1: Average Severity of Lines in the Non-Irrigated Hill Plots
And the Irrigated Scab Nursery

Line	Average Severity (%)		Irrigated Nursery Scabby-Corn Inoculum
	Non-Irrigated Hill Plots		
	Inoculated Plots	Non-Inoculated Plots	
96C-0763-1	80.42	19.52	59.42
96C-0767-1-1	86.67	27.25	79.30
96C-0769-7-1	54.13	26.19	60.70
96C-0769-7-3	73.57	30.86	53.70
96C-0770-3	73.55	76.60	41.27
96C-0772-2	56.08	94.80	33.57
96C-0772-6-2	40.26	missing data	54.24
96C-0787-2	52.10	46.80	72.58
97C-0062-1-1	44.33	5.41	43.39
97C-0067-3	45.82	11.67	47.02
97C-0111-3-1	42.25	0.00	19.44
97C-0173-1	71.51	9.39	51.06
98C-1161-04	49.20	33.02	41.35
98C-1162-01	29.13	49.91	39.80
98C-1164-01	67.20	9.81	48.67
98C-1169-02	76.16	34.98	34.95
98C-1169-05	28.50	81.18	29.64
98C-1169-06	76.96	49.69	11.44
98C-1169-07	61.75	77.61	24.63
98C-1169-08	72.88	63.28	56.31
98C-1190-06	88.30	63.27	36.44
98C-1191-01	98.89	87.79	57.70
98C-1211-09	40.95	26.21	44.54
98C-1257-02	46.50	26.05	57.98
98C-1352-01	74.29	58.86	73.82
98C-1421-01	93.69	49.70	45.65
98C-1440-01	59.00	31.47	41.63
98C-1440-02	38.38	61.23	52.15
98C-1446-02	86.47	81.74	23.01
98C-1517-01	80.79	39.43	53.73
25R37	45.57	5.68	50.64
McCormick	31.84	12.08	31.06
AVERAGE	61.47 a*	41.66 b	45.96 b
LSD	17.00	12.98	14.54

*Means for overall average followed by different letters represent significant differences at P<0.05