

## **Soft Red Winter Wheat Breeding and Variety Development For Kentucky Final report: September 1, 2008 – December 31, 2009**

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### **Greenhouse crossing**

In 2009 the breeding project made 1365 crosses. These comprised both 2 parent and 3 parent crosses in which we strive to combine some source of scab resistance, either Chinese or native soft red winter, and a source or sources of yield potential, test weight, lodging resistance and other essential agronomic characteristics. Some of these crosses were put on the fast track by growing the F<sub>1</sub> generation in Argentina during their winter, thus saving a year. Others were subjected to molecular marker screening to detect Fhb1, the scab resistance gene, so that the breeding populations that go to the field consist only of plants containing the gene.

### **Field Plots**

In 2009 the breeding program planted:

- 3100 plots at Lexington
- 1450 plots at Woodford Co.
- 2465 plots at Schochoh
- 1525 plots at Princeton
- **8540 plots in total**

Plots included:

- F<sub>2</sub> populations
- F<sub>3</sub> populations
- F<sub>4</sub> populations
- Preliminary Trials – one rep, two locations
- Advanced Trials – two reps, three locations
- Max Trials – three reps, four locations
- Increases – grown at Lexington or Princeton

### **Headrows**

20,000 headrows were grown at Lexington and Princeton. These consisted of:

- F<sub>5</sub> headrows
- F<sub>1</sub> rows
- Purification headrows
- Scab Nurseries (LEX, PRN)
- Genetic studies

### **Variety release**

Two lines, KY97C-0519-04-07 and KY97C-0321-02-01, were grown in a .5 acre block at Princeton and a 1 acre block at Lexington, respectively. These lines had performed very well in the previous 3 years of testing, demonstrating excellent yield potential and resistance to spring freeze. However, it was known that their scab resistance was

marginal and we considered 2009 to be a make or break year for them. In the face of the scab epidemic of 2009, even when protected with fungicide, scab damage in these lines was unacceptable, so the increases were not harvested. We have just completed the 3<sup>rd</sup> backcross of the Fhb1 resistance gene into these lines and will take them to the field next fall in the hope that we can release scab resistant versions of these lines.

### **Breeding Line Tests**

The remainder of the report consists of breeding line yield tests; all of these tables represent multi-year data except PT 2009, for which there is only 2009 data. We are particularly excited about the lines in the ScabMax test table because they all contain Fhb1, the scab resistance gene and the top lines definitely have competitive yield track records. Several of these lines are entered in the state wheat variety trial for 2010.

**KY Lines in the State Variety Trial  
2007-2008**

<b>Entry</b>	<b>Yield (bu/a)</b>
KY 97C-0519-04-07	78.7
AgriPro COKER Branson	78.6
AgriPro COKER W1377	78.0
Truman	77.5
Pioneer variety 25R63	76.7
Pioneer variety 25R54	74.8
Pioneer variety 26R15	74.7
Delta Grow 5200	74.2
Exsegen Dinah	73.7
KY 97C-0321-02-01	73.1
Ebberts 575	72.7
Beck 122	72.7
USG 3350	72.4
Pioneer variety 26R22	72.0

These two lines were increased in 2009, inspected by KSIA, but ultimately dropped due to insufficient scab resistance.

Resistance gene backcrossed into both lines – BC3 in November.

# Prelim Trial 2009 Average of 2 Environments in Kentucky

<b>Entry</b>	<b>Yield (bu/a)</b>	<b>Test Wt. (lb/bu)</b>	<b>Height(in)</b>	<b>Scab (0-9)</b>
KY03C-2049-02	93.1	58.4	40	3
KY03C-1221-28	88.9	55.9	41	5
KY03C-1221-01	83.4	56.6	37	6
KY03C-1492-11	82.0	57.1	35	3
KY03C-1221-24	80.8	55.7	41	4
KY03C-2069-03	79.3	57.4	42	4
KY03C-1221-07	78.7	55.9	35	4
KY03C-2314-03	78.7	54.7	41	4
KY03C-2047-05	78.5	55.7	42	2
Pembroke	77.0	58.2	38	4
KY03C-1221-09	76.3	57	40	6
KY03C-2292-01	76.2	57.2	39	6
KY03C-1211-04	75.7	59.6	37	7
KY03C-1221-29	75.6	55	38	7
KY03C-2047-03	75.3	55.9	41	4
Truman	69.7	58.1	42	1

## Advanced Trial 09 Entries: Averaged over 2 Years and 4 Environments in KY

Entry	Yield (bu/a)	Test Wt. (lb/bu)	Height (in)	Pedigree
KY03C-1002-02	93.0	57.3	38	25W33/25W60//25W33/KY90C-042-37-1
KY03C-1237-10	92.3	56.4	35	<a href="#">25R18</a> /92C-0017-17//KY96C-0767-1
KY02C-1108-13	91.4	55.3	30	Allegiance// <a href="#">Futai9002</a> / <a href="#">Roane</a> //KAS Justice
KY02C-2200-14	89.9	55.8	40	CG 544W/25R49
KY03C-1237-11	89.6	57.1	34	<a href="#">25R18</a> /92C-0017-17//KY96C-0767-1
KY02C-2200-16	89.4	56.0	37	CG 544W/25R49
KY03C-1237-12	89.1	56.6	35	<a href="#">25R18</a> /92C-0017-17//KY96C-0767-1
KY02C-2200-12	89.0	55.1	39	CG 544W/25R49
KY03C-1192-28	88.7	56.7	30	KY93C-0876-66// <a href="#">KY96C-0059-21</a>
KY03C-1237-39	88.3	56.9	34	<a href="#">25R18</a> /92C-0017-17//KY96C-0767-1
KY03C-1180-02	88.2	56.6	36	25W60/KY93C-0876-66
KY03C-1192-18	88.1	57.4	33	KY93C-0876-66// <a href="#">KY96C-0059-21</a>
KY03C-1136-11	88.0	55.9	35	CG 554W/25R37//CG 554W/ <a href="#">Tribute</a>
PEMBROKE	81.0	57.0	36	CHECK
TRUMAN	72.0	57.2	41	CHECK

## MAX 2 2009 Entries: Average of 2 Years and 5 Environments in Kentucky

<b>Name</b>	<b>Yield (bu/a)</b>	<b>Test Wt. (lb/bu)</b>
KY01C-1531-13	77.5	56.7
KY01C-1537-05	77.4	55.9
Branson	75.1	55.1
Pembroke	74.1	56.7
KY01C-1002-12	74.0	56.7
KY01C-1531-14	73.3	56.4
KY01C-1002-07	73.2	57.9
KY01C-1094-31	73.0	55.2
KY01C-1531-17	72.7	57.3
KY01C-1595-19	70.2	54.9
KY01C-1156-08	70.2	55.7
KY01C-1346-07	70.1	54.1
KY01C-1587-18	69.9	54.3
KY01C-1002-33	69.9	55.6
KY01C-1537-08	69.9	56.7
Truman	69.7	56.7

## MAX 1 2009 Entries: Average of 2 Years and 5 Environments in Kentucky

<b>Name</b>	<b>Yield (bu/a)</b>	<b>Test Wt. (lb/bu)</b>
KY01C-1319-15	79.0	56.6
KY01C-1318-11	78.8	55.5
KY01C-1318-14	78.7	56.1
KY01C-1319-14	78.4	57.2
KY01C-1088-12	78.4	55.1
Branson	77.3	55.1
Pembroke	77.0	56.7
KY01C-1070-02	76.9	58.3
KY01C-1156-02	76.6	56.7
KY01C-1318-10	76.6	56.1
KY01C-1158-06	76.5	56.0
KY01C-1158-08	76.3	56.0
KY01C-1070-05	76.1	56.8
KY01C-1319-10	75.8	55.1
KY01C-1070-10	75.4	57.9
KY01C-1320-14	75.0	57.0
Truman	71.0	56.7

## Max 2009 Entries: Average of 3 Years and 7 Environments in KY

Entry	2007-2009		2008-2009	
	Yield (bu/a)	Test Wt. (lb/bu)	Yield (bu/a)	Test Wt. (lb/bu)
KY01C-1318-11	79.3	56.3	78.8	55.5
KY01C-1318-10	77.2	57.1	76.6	56.1
KY01C-1158-06	76.1	56.9	76.5	56.0
KY01C-1319-15	75.3	57.0	79.0	56.6
KY01C-1531-13	75.3	57.1	77.5	56.7
KY01C-1094-06	75.2	57.4	74.2	56.5
KY01C-1318-13	74.2	56.6	72.6	55.4
KY01C-1318-14	74.1	57.0	78.7	56.1
KY01C-1088-12	73.3	55.8	78.4	55.1
KY01C-1318-16	73.2	56.3	72.6	55.5
KY01C-1319-14	73.0	57.7	78.4	57.2
KY01C-1156-02	72.9	56.9	76.6	56.7
Branson	•	•	77.3	55.1
Pembroke	•	•	77.0	56.7
KY01C-1094-31	72.8	55.3	73.0	55.2
KY01C-1319-09	72.0	55.1	74.0	54.5
KY01C-1002-12	72.0	57.0	74.0	56.7
KY01C-1070-10	71.7	58.6	75.4	57.9
Truman	67.0	56.7	71.0	56.7

# ScabMax 2009 Entries: Average of 3 Years and 6 Environments in KY

<b>Entry</b>	<b>2007-09</b>	
	<b>Yield (bu/a)</b>	<b>Test Wt. (lb/bu)</b>
KY02C-3004-07	79.1	58.2
KY02C-3007-55	74.9	56.9
KY02C-3006-51	74.9	56.5
KY02C-3004-02	74.6	59.6
KY02C-3006-46	73.4	57.5
KY02C-3007-41	73.3	55.8
KY02C-3007-45	73.1	57.4
KY02C-3006-43	72.6	56.6
Truman	72.0	57.1
KY02C-3008-07	71.6	56.5
KY02C-3006-48	70.8	57.7
KY02C-3008-04	70.7	55.3
KY02C-3008-01	70.5	57.3
KY02C-3006-11	70.2	56.2
KY02C-3007-37	70.0	56.5
KY02C-3006-27	69.9	55.9
KY02C-3006-52	69.4	57.0
KY02C-3006-19	69.3	57.1
KY02C-3006-17	67.3	56.2
KY02C-3006-03	66.9	55.6
KY02C-3006-21	66.8	56.7
KY02C-3005-25	66.0	58.2