

2005 ANNUAL REPORT
WHEAT RESEARCH AND PROMOTION BOARD

TITLE: Breeding for Improved Wheat Cultivars

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OBJECTIVES:

Develop and release wheat cultivars with high yield potential, high test weights, straw strength, winter hardiness, early maturity, and resistance to diseases common to Arkansas through pedigree, bulk population, and backcross breeding methods.

Cooperate with other public programs to identify lines adapted to Arkansas which can be released through the Foundation Seed Program and join other institutions in joint releases.

ABSTRACT:

Planting season started off fairly well. Head-row material (F₄ and F₅ lines) were planted at Fayetteville on October 18 and the Cultivar Performance test at Rohwer was planted on October 22. Both of these dates were optimum. The F₄ and F₅ lines at Fayetteville grew very well and the inoculation with stripe rust was very effective. The severe infection allowed for a good evaluation of resistance among the lines for the disease. Of the more than 17,000 lines planted, about 300 resistant F₅ lines were harvested for future yield testing. Approximately 7,000 individual plants were also selected to be used to produce F₅ lines for selecting in 2005-06.

Wet soil conditions across the state, caused problems at planting at several of our locations. The breeding yield trials and variety tests that were planted at Marianna on October 25, had poor stands due to the rains immediately after planting. The second attempt at the variety test which was planted on Nov 9 was very good. The first N application was applied on Feb 15 and the second application was on Feb 28. Although the stands of the breeding yield trials are not optimum they were harvested. Field trials planted at Keiser on Nov 10 started out excellent and N was applied on Jan 27 and March 4. A drought during grain fill somewhat lowered yields and test weights. Planting of the main breeding nursery at Stuttgart began on Nov 10 but did not get completed due to rain. Stands of the tests that were planted were very poor but it was fertilized (Feb 18 and March 2) in hopes of using the plots for collecting agronomic and disease data. Some disease data was taken and the Wheat Observation nursery was harvested as a seed source. Much of the breeding material that could not be planted at Stuttgart was moved to the LSU Ag Experiment Station at Winnsboro, LA (planted Nov 16). These plots were fertilized but

abandoned in April due to poor stands. Additional material from Stuttgart was planted at Hope. These plots were fertilized on Jan 25 and Feb 16. All the yield trials at Kibler were not usable. The seed increases were marginal but were fertilized on Feb 17. All of the F₄ populations planted at Kibler were lost due to an error by a tractor driver.

The breeding yield trials at Hope, Stuttgart, Marianna, and Keiser were harvested between June 2 and June 13. The results from the most advanced nursery are given in Table 1. Several lines derived from the cross of Jackson x Pioneer 2643 (AR96077) look very promising and will be evaluated in Regional Nurseries. Table 2 gives the performance of lines in the Advanced Wheat Strains (AWS) nursery at Keiser. Almost all of the experimental lines outperformed the check varieties in the test. However, all the check varieties performed poorly at this location for some reason. While this is true, many of the experimental lines did perform very well. The AWS test was also harvested at Marianna.

During the winter the crossing program to produce future lines was expanded. There were over a hundred successful crosses in four efforts: 1) standard variety development, 2) scab-resistant varieties, 3) imidazolinone herbicide resistant varieties and, 4) specialty types (white and waxy wheats). The objective of the crossing efforts are to stress yield potential, test weight, value-added traits, and disease resistance.

INTRODUCTION:

In Arkansas, wheat yields have increased at a rate of about 0.5 bu/A per year since 1924. Yield increases in wheat and other crops are due to improved cultural practices as well as genetic improvement. Studies in other regions have estimated that improved wheat cultivars are responsible for somewhere between 28% to 55% of the yield increases. Pathogens are also under genetic control and will select races which will attack prevalent cultivars. The absence of aggressive breeding programs would not only stop yield increases due to new cultivars but also the yield of cultivars currently grown would decrease since pests would develop which would overcome resistance.

The University of Arkansas' breeding program has stressed cultivar development through the use of adapted crosses to maximize efficiency but has continued to broaden the genetic base of the program to guard against genetic vulnerability and limited genetic improvement. The program uses a combination of the bulk and pedigree methods to minimize cost. In order to obtain high yielding, adapted cultivars, increased emphasis will be given to disease resistance. The Arkansas program unlike other programs is putting major emphasis on the development of high test weight genotypes since a substantial component of test weight is under genetic control.

MATERIALS AND METHODS:

Parents are chosen for their high-yield potential and adaptation to Arkansas conditions. Crosses are being made between genotypes with complementary traits in the greenhouse at Fayetteville. The F₁ generation is also grown in the greenhouse. Beginning with the F₂ generation, a combination of pedigree and bulk breeding methods are followed until sufficient homozygosity is reached to increase seed for yield testing.

Selected lines are then tested and re-selected in replicated yield plots. Lines selected move in a step-wise progression through the following nurseries: Wheat Observation (2 locations with one replication per location), Advanced Wheat Strains (3 locations), and Elite Wheat Lines (3 locations). Locations include Kibler, Stuttgart, Keiser, Marianna, and Rohwer. Numerous locations are used to help ensure selection of genotypes that are adapted to a number of soil types and environments. All lines in the nurseries are harvested for yield, and data is taken on test weight, lodging, maturity date, plant height, and winterhardiness. Reaction type and level of severity of diseases present is also recorded each spring. Lines that appear to have potential as cultivars are entered in the Arkansas Commercial Variety Test. The seed of each line in the Elite Wheat nursery is sent to the USDA Soft Wheat Quality Lab to be tested for baking and milling quality to ensure that the lines released from the program meet industry standards.

Other Universities in the soft wheat region have variety development programs. Evaluation of public lines initially takes place in regional uniform nurseries and then through the commercial variety test. Released lines adapted to Arkansas will be introduced through the foundation seed program to seedsmen.

RESULTS AND DISCUSSION:

Results from this year's research are found on the following pages. The information is divided into three basic sections: 1) New and future releases, 2) Yield nurseries and 3) Early generations.

1) NEW AND FUTURE RELEASES:

Recent releases continue to perform well. AR910-9-1 was licensed last year through an agreement with Delta King Seed Company which will have exclusive rights to market the variety in Arkansas. This line will be labeled as Delta King GR9108. It is an early maturing variety and has very good resistance to stripe rust. This past year in the Arkansas Variety Test it averaged 81.6 bu/A over all locations, which ranked it 6th among the 100 varieties in the test. All available foundation seed of Pat was sold this year. Certified seed sales of both have been good. Sabbe has been the best line in the soft-wheat growing region of Kansas and Kansas Foundation Seed is now buying seed.

This year we are purifying and increasing seed of two selections from the cross Jackson/Pioneer 2643 (AR96077). They are being tested in the State Variety Test and regional yield trials this year in anticipation of possible release.

2) YIELD NURSERIES

The most advanced experimental lines were planted in the Elite Wheat Lines (EWL) nursery at Keiser, Stuttgart, and Marianna. As previously mentioned most of the tests at Stuttgart were not planted or not harvested for yield due to inadequate stands. The performance of the experimental lines averaged across Keiser and Marianna is presented in Table 1. Yields were relatively high at Keiser and several experimental lines had higher yields averaged across locations than that of the standard check variety, NK Coker 9663. AR96077-10-1 and AR96077-7-2 were entered in the 2005-06 Arkansas State Variety Test. AR96077-10-1 was entered in the Southern Regional and AR96077-7-2 in the Eastern Regional yield trials for the 2005-06 growing season. These lines have excellent yield potential and stripe rust resistance.

The Advanced Wheat Strains nursery was planted at Keiser, Stuttgart, and Marianna. The test at Stuttgart was not harvested due to poor stands and the test at Marianna was harvested although precision of the test was poor. Results are given for the Keiser location in Table 2. There were several experimental lines that appeared promising. These lines were advanced to the Elite test for further testing in 2005-06.

The Wheat Observation Yield nursery was planted at Stuttgart and Keiser. The yield results from these two locations is given in Table 3. Also included are test weight data from both locations and heading and maturity dates from the Keiser test. This represents the first yield data from lines selected from F₆ head rows in 2003-04. Several experimental lines that appear promising were advanced to the Advanced Wheat Strains test for further testing in 2005-06.

To enhance disease resistant to Fusarium Head Blight (Scab) a special nursery is conducted to screen experimental lines for agronomic traits as well as scab resistance. The results of this nursery are presented in Table 4 and 5. Several lines possess the same level of resistance as the resistant check 'Ernie' but have yields similar to 'Pat'.

Table 1. Performance of experimental lines in the Elite Wheat Lines at Marianna and Keiser.

Name	Yield	Test Wt	Plant Ht	Heading Date	Mature Date	Stripe Rust	Diseased Leaves
12: AR96052-4-3	79.2	57.1	33	418	524	0	70
7: AR96077-7-2	78.5	58.2	26	420	524	7	70
40: AP BERETTA	78.4	57.8	33	427	527	.	.
15: AR96077-10-1	78.2	57.5	31	419	524	0	30
31: TX02D5406	76.7	59.5	30	420	527	0	50
3: AR93035-4-1	74.8	59.2	31	422	525	2	85
21: ARGE97-0002-3-4	72.9	58.9	35	418	523	2	50
13: AR96077-7-3	72.8	58.5	28	421	527	0	85
38: AGS 2000	72.8	59.1	34	416	527	.	.
25: TX02D5270	72.1	57.4	35	420	523	7	98
39: DIXIE 900	72.0	58.2	34	421	527	.	.
1: AR910	70.1	57.4	33	418	524	0	50
2: AR93027-5-1	70.0	58.2	30	420	527	50	93
20: ARGE97-3005-17-	69.8	57.4	31	415	523	0	30
18: AR96077-3-1	69.7	59.3	32	420	523	2	70
10: AR96141-4-1	69.6	57.9	37	421	523	70	98
4: AR93027-3-2	69.2	58.1	30	419	523	85	98
8: AR96052-4-2	68.7	57.0	31	417	523	50	85
16: AR96150-2-1	67.7	57.6	29	413	523	30	98
6: TX02D5270	67.1	58.9	34	419	523	0	70
34: TX02D7307	67.0	56.4	38	419	524	0	50
23: ARGE97-0027-3-3	66.9	60.4	36	417	527	0	70
35: PAT	66.9	59.1	29	430	530	2	30
14: AR96031-1-1	65.9	58.2	30	421	527	50	93
22: ARGE97-1017-4-1	65.5	60.3	33	422	527	0	30
27: TX95-115	64.8	58.7	34	421	523	2	85
17: AR96141-5-1	64.6	58.9	37	419	527	50	98
5: AR850-1-1	64.4	58.8	31	429	528	0	30
11: AR92024-4-2	64.4	59.3	32	420	529	0	30
28: HBB362-7	64.3	58.2	39	419	527	0	70
9: AR96024-4-1	62.0	59.8	30	421	524	2	30
19: AR96086-2-1	60.4	57.2	32	414	523	0	70
30: TX02D5356	59.3	60.3	30	419	523	0	70
32: TX02D6833	58.8	57.5	31	421	527	2	50
37: COKER 9663	58.5	57.9	35	417	526	.	.
26: TX02D5271	57.7	57.5	33	421	527	0	50
29: TX02D5115	53.0	56.5	31	415	523	2	85
33: TX02D7296	52.3	59.3	30	419	524	7	85
36: SABBE	49.2	57.3	32	429	527	0	5
24: ARGE97-1022-5-1	49.0	57.9	34	421	527	0	30

Table 2. Performance of experimental lines in the AWS at Keiser 2004-05

ENT #	ENTRY NAME	Yield	Test	Heading	Mature
			Wt	Date	Date
13	AR97139-14-1	92.3	58.2	422	523
9	AR97226-1-1	92.2	58.2	418	523
6	AR97139-15-2	91.6	56.6	420	523
39	AR97149-8-1	91.5	58.0	418	523
3	AR97139-15-1	91.1	56.0	420	523
12	AR97044-10-2	88.8	57.3	422	525
1	AR97139-9-2	88.5	56.8	419	523
40	AR97139-5-1	86.6	58.1	422	525
26	AR97139-9-1	85.5	56.3	420	523
17	AR97170-1-1	84.5	60.3	429	527
10	AR97139-19-2	83.7	57.8	422	523
18	AR97139-11-1	83.0	58.4	423	526
7	AR97044-10-1	82.4	58.1	423	526
16	AR97031-8-1	81.3	59.3	422	524
21	AR97109-9-1	81.1	56.4	422	524
5	AR97225-4-1	80.4	58.4	419	525
33	AR97244-4-1	79.7	55.7	422	526
14	AR97044-10-3	79.6	58.3	422	525
28	AR97226-6-1	79.0	59.2	419	525
22	AR97149-9-2	77.3	57.5	419	523
58	AR97143-7-1	77.2	56.8	422	526
19	AR97226-1-2	76.9	56.5	420	523
50	AR97139-11-2	76.5	57.8	425	527
37	AR97144-5-1	76.2	58.9	421	523
31	AR97106-2-1	75.9	58.7	422	523
15	AR97100-4-1	75.4	58.6	429	529
51	AR97068-6-1	75.2	57.2	429	527
27	AR97044-12-1	75.1	59.9	423	525
49	AR97243-4-1	74.5	56.3	421	523
2	AR97109-9-3	73.3	55.8	423	525
24	AR97130-4-1	73.1	60.0	423	527
53	AR971368-5-1	72.8	57.2	427	531
55	AR97021-1-2-3	72.4	59.8	429	531
8	AR97170-2-1	72.0	61.3	433	528
54	AR97044-3-1	71.6	60.5	428	527
43	AR97083-1-2	71.4	59.3	425	526
56	AR97100-1-1	71.2	59.0	433	531
41	AR97044-12-3	70.0	59.1	423	526
32	AR97154-2-1	69.8	57.9	429	527
30	AR97068-5-1	69.7	57.8	429	528
29	AR97083-1-1	69.3	59.1	424	525
25	AR97100-3-1	69.3	58.9	433	530
35	AR97044-12-2	69.1	59.4	423	523
36	AR97143-7-2	68.5	57.1	422	523
48	AR97026-9-1	67.9	58.1	422	523
20	AR97026-8-1	67.0	59.4	422	523
42	AR97068-5-2	66.6	58.1	429	527
11	AR97031-1-2	65.7	58.8	425	527
44	AR97128-2-1	65.4	57.9	433	530

34	AR97139-18-2	64.7	56.5	423	523
4	AR97139-10-1	60.9	59.3	427	525
23	AR97217-1-1	60.2	59.1	423	526
52	AR97128-2-2	51.8	58.8	435	531
38	AR97152-3-1	50.2	59.8	433	528
61	AGS 2000	43.1	55.2	422	523
57	AR97127-9-1	42.5	55.9	423	525
47	AR97120-6-1	42.2	57.9	433	529
45	AR97021-1-2-4	39.2	59.3	435	531
62	Sabbe	37.9	56.9	429	526
59	AR97131-1-3	34.6	57.2	429	525
60	Pat	32.1	56.9	435	525
46	AR97128-1-1	20.6	57.7	436	602

Table 3. Performance of breeding lines and checks in the Wheat Observation Yield Nursery in 2005 at Stuttgart and Keiser.

Entry #	Entry Name	Yield			Test Weight		Head date	Mature date
		Keiser	Stutt	Avg	Stutt	Keiser		
		-----bu/A-----			-----lb/bu-----			
308	98093-3-1	92.7	67.6	80.1	59.1	59.3	421	523
464	98172-6-1	79.1	75.3	77.2	55.3	57.2	424	527
279	98083-10-1	87.6	66.7	77.1	55.0	54.8	420	526
369	98106-4-1	86.9	63.7	75.3	59.2	57.9	419	524
463	98172-3-1	73.0	63.7	68.4	55.0	57.9	424	527
277	98083-8-1	74.4	62.2	68.3	57.1	58.8	420	526
234	98072-2-2	93.8	41.9	67.9	59.8	57.5	418	525
276	98083-7-1	77.6	54.3	65.9	57.0	59.2	422	525
341	SABBE	53.7	77.5	65.6	57.2	57.5	429	528
141	AR910	74.1	56.7	65.4	60.8	59.6	423	527
339	98097-5-1	75.4	54.1	64.7	56.7	56.8	423	526
338	98097-4-1	73.4	55.8	64.6	59.6	59.1	425	528
15	98003-7-1	92.3	36.6	64.5	60.1	58.0	418	520
309	98093-5-1	75.8	52.0	63.9	58.8	59.0	422	523
280	98083-10-2	78.0	47.0	62.5	57.3	54.5	418	525
88	98023-5-1	74.4	50.5	62.5	56.4	57.8	429	526
401	SABBE	43.0	81.5	62.3	55.8	57.0	433	528
312	98093-5-3	78.1	46.2	62.1	58.4	59.6	422	525
297	98088-3-2	83.6	40.0	61.8	59.3	57.2	418	524
313	98093-5-4	70.3	52.5	61.4	58.1	58.9	422	525
85	98023-2-2	77.9	44.7	61.3	58.2	57.2	419	524
442	98152-1-1	86.0	36.6	61.3	59.9	58.1	421	525
233	98072-2-1	91.0	31.4	61.2	60.0	58.6	418	523
63	98021-11-2	70.5	51.5	61.0	58.1	59.7	425	
271	PAT	63.6	58.1	60.9	58.3	59.3	435	531
211	PAT	70.4	51.1	60.8	58.4	59.6	434	531
372	98106-8-2	62.9	58.5	60.7	58.9	57.9	433	531
299	98088-6-2	78.6	42.6	60.6	57.2	57.6	422	528
278	98083-9-1	63.3	57.8	60.5	56.4	58.4	421	527
302	98088-7-2	80.7	40.2	60.5	57.8	57.9	422	526
300	98088-7-1	72.0	48.9	60.4	57.7	57.5	422	527
292	98088-1-2	78.7	41.6	60.2	59.8	60.4	422	527
81	AR910	64.4	53.3	58.9	59.3	59.3	422	526
241	PAT	68.1	49.4	58.7	58.4	59.6	435	531
214	98068-4-1	66.9	50.5	58.7	57.4	61.3	432	530
284	98084-4-1	78.9	38.4	58.6	59.0	58.7	422	525
370	98106-8-1	66.5	50.1	58.3	59.3	61.4	424	531
434	98127-1-1	59.0	57.4	58.2	61.4	59.3	422	525
462	98172-1-2	63.3	53.1	58.2	56.5	57.9	424	527
303	98089-2-1	61.9	54.4	58.2	58.7	59.5	421	523
351	AR910	71.1	45.1	58.1	58.6	59.4	423	524
261	AR910	74.2	41.9	58.1	59.1	59.8	425	525
441	AR910	71.5	44.5	58.0	59.1	57.4	423	525
151	PAT	71.2	44.8	58.0	57.7	59.6	433	530
225	98070-7-4	60.3	55.6	58.0	58.4	59.0	427	526
282	98084-1-1	71.4	44.5	57.9	57.2	57.1	422	525
290	98088-1-1	80.0	35.8	57.9	59.5	59.7	422	525
169	98045-1-2	68.9	46.8	57.9	59.7	59.1	422	523

Table 3. Performance of breeding lines and checks in the Wheat Observation Yield Nursery in 2005 at Stuttgart and Keiser.

Entry #	Entry Name	Yield			Test Weight		Head date	Mature date
		Keiser	Stutt	Avg	Stutt	Keiser		
		-----bu/A-----			-----lb/bu-----			
177	98047-3-2	79.7	35.9	57.8	58.0	61.3	425	527
269	98083-1-1	71.9	43.4	57.6	59.6	60.8	427	527
329	98096-3-1	64.8	50.2	57.5	56.7	57.1	429	527
431	SABBE	47.8	67.1	57.5	56.9	57.4	429	528
66	98021-12-1	66.0	48.8	57.4	57.7	58.6	429	525
402	98109-9-3	59.2	55.1	57.2	57.4	58.6	433	527
171	AR910	66.3	47.9	57.1	59.3	59.5	422	524
270	98083-1-2	72.3	41.3	56.8	59.8	60.6	423	527
212	98068-2-2	78.7	34.8	56.8	59.0	60.9	422	526
210	98068-2-1	75.3	38.1	56.7	58.3	60.7	422	525
368	98106-3-1	89.8	23.3	56.6	58.8	57.9	421	524
293	98088-2-1	78.6	33.4	56.0	58.9	58.7	421	526
272	98083-1-3	74.7	37.1	55.9	59.5	60.6	423	527
444	98152-4-1	77.0	34.9	55.9	59.3	57.9	421	525
5	98003-1-1	74.1	37.4	55.7	57.6	56.5	427	524
111	AR910	69.1	42.3	55.7	59.6	59.3	423	525
231	AR910	71.7	39.7	55.7	58.9	59.3	423	525
301	PAT	58.2	53.1	55.6	58.4	59.5	435	531
4	98001-5-2	67.6	42.9	55.3	57.2	58.7	422	524
296	98088-3-1	80.0	30.2	55.1	60.1	58.0	418	524
201	AR910	75.3	34.8	55.1	58.4	59.6	424	525
378	98107-4-1	61.2	48.4	54.8	57.9	58.1	423	525
391	PAT	61.3	47.6	54.5	57.6	59.6	433	531
68	98021-12-3	55.9	53.1	54.5	58.0	58.6	429	525
331	PAT	61.5	47.4	54.5	58.6	59.3	435	531
352	98098-11-2	72.5	36.3	54.4	58.9	56.7	422	524
285	98084-4-2	71.1	37.6	54.4	58.9	58.6	422	525
340	98097-6-1	57.4	51.1	54.3	59.8	60.3	429	531
371	SABBE	36.8	71.7	54.2	56.6	57.8	433	531
298	98088-6-1	69.4	38.9	54.2	57.8	58.3	422	527
35	98011-6-1	67.2	40.9	54.1	56.5	57.7	418	523
327	98096-1-3	63.8	44.0	53.9	56.4	58.8	427	525
259	98082-1-3	56.2	51.6	53.9	58.5	57.7	425	525
178	98047-4-1	69.1	38.7	53.9	60.3	60.3	424	526
433	98121-14-1	44.6	63.1	53.9	57.0	58.6	425	524
242	98075-5-1	72.0	35.7	53.8	59.2	60.7	425	528
366	98105-4-1	71.9	35.8	53.8	59.0	59.0	422	525
295	98088-2-3	65.3	41.8	53.5	59.0	59.3	420	526
321	AR910	72.6	34.4	53.5	58.8	59.2	423	525
257	98082-1-1	53.4	53.6	53.5	58.6	57.7	425	524
128	98036-4-2	66.3	40.7	53.5	59.6	60.3	427	527
381	AR910	67.0	39.7	53.4	58.5	58.9	423	525
179	98047-4-2	67.1	39.2	53.2	59.2	60.3	427	526
21	AR910	61.7	44.4	53.1	59.0	57.0	422	520
364	98105-3-1	79.2	26.8	53.0	61.2	60.8	429	524
181	PAT	65.5	40.0	52.8	58.9	59.5	433	530
65	98021-11-4	63.9	41.3	52.6	57.4	59.0	435	527
333	98096-6-2	66.2	38.9	52.6	58.5	58.5	426	527

Table 3. Performance of breeding lines and checks in the Wheat Observation Yield Nursery in 2005 at Stuttgart and Keiser.

Entry #	Entry Name	Yield			Test Weight		Head date	Mature date
		Keiser	Stutt	Avg	Stutt	Keiser		
		-----bu/A-----			-----lb/bu-----			
365	98105-3-2	73.2	31.9	52.5	60.7	59.9	420	525
3	98001-5-1	80.8	24.1	52.5	57.7	59.1	422	524
244	98075-7-1	83.9	21.0	52.5	60.5	62.1	422	525
330	98096-3-2	51.1	53.6	52.4	56.3	56.7	429	527
307	98092-2-3	56.1	48.7	52.4	59.5	57.8	425	526
350	98098-11-1	70.6	33.9	52.2	58.6	57.9	421	524
87	98023-4-2	50.9	53.5	52.2	56.0	57.5	425	525
361	PAT	60.7	43.3	52.0	58.9	59.6	435	531
326	98096-1-2	56.4	47.4	51.9	56.6	59.2	429	527
183	98048-1-3	66.9	36.6	51.8	51.9	55.2	429	527
89	98023-5-2	68.5	35.0	51.8	56.0	57.7	429	526
174	98046-6-2	72.7	30.3	51.5	61.6	60.1	422	524
310	98093-5-2	50.2	52.3	51.2	58.6	57.4	429	528
224	98070-7-3	57.1	45.3	51.2	58.3	59.9	427	526
291	AR910	67.3	35.0	51.2	59.1	59.5	423	527
215	98068-4-2	49.0	53.1	51.1	56.8	58.0	433	531
390	98109-3-1	63.6	37.9	50.7	56.5	58.6	429	527
383	98108-2-1	70.7	30.5	50.6	59.9	58.9	422	525
13	98003-4-2	61.9	39.2	50.6	60.1	58.6	418	521
77	98022-18-1	62.7	38.3	50.5	58.0	57.8	419	523
359	98103-4-1	69.9	31.0	50.5	59.9	59.3	421	523
335	98096-8-1	61.2	39.7	50.4	56.7	59.5	425	527
481	PAT	68.8	31.8	50.3	59.3	59.4	429	531
49	98017-2-2	59.7	40.5	50.1	59.6	60.7	425	524
328	98096-2-1	53.6	45.9	49.7	58.4	59.2	429	527
118	98030-5-2	45.0	54.5	49.7	55.2	59.1	432	526
367	98106-1-1	79.8	19.5	49.7	58.6	60.6	425	527
67	98021-12-2	47.2	52.1	49.6	58.8	58.3	429	525
324	98094-8-2	68.1	31.1	49.6	59.5	58.7	420	523
75	98022-4-1	66.9	32.1	49.5	57.1	55.7	422	523
314	98093-6-1	68.8	30.2	49.5	59.1	59.4	423	525
172	98046-2-1	50.4	48.5	49.5	59.7	58.5	427	524
400	98109-9-2	35.5	62.8	49.1	58.6	56.4	433	528
377	98107-1-1	63.9	34.2	49.1	60.1	58.4	421	524
129	98036-4-3	65.5	32.5	49.0	60.1	60.1	428	527
176	98047-3-1	66.9	30.9	48.9	58.7	60.3	427	527
173	98046-6-1	61.9	35.8	48.8	60.8	60.0	422	525
450	98152-9-2	73.3	24.3	48.8	59.3	59.8	427	525
320	98094-7-1	45.1	52.3	48.7	59.1	58.6	422	525
337	98097-2-2	68.2	29.2	48.7	59.6	60.6	432	528
139	98040-2-3	53.2	44.1	48.6	60.3	60.3	423	524
458	98159-5-2	76.5	20.7	48.6	59.6	58.8	423	527
226	98070-7-5	50.9	46.1	48.5	58.1	58.9	427	526
332	98096-6-1	62.3	34.4	48.3	58.0	58.0	426	526
240	98075-3-2	57.3	39.2	48.3	58.6	59.2	422	525
52	98017-2-4	50.1	46.1	48.1	60.2	60.1	425	524
411	AR910	66.4	29.3	47.9	58.9	58.7	422	526
17	98005-1-1	53.2	42.5	47.8	57.6	55.2	420	522

Table 3. Performance of breeding lines and checks in the Wheat Observation Yield Nursery in 2005 at Stuttgart and Keiser.

Entry #	Entry Name	Yield			Test Weight		Head date	Mature date
		Keiser	Stutt	Avg	Stutt	Keiser		
		-----bu/A-----			-----lb/bu-----			
86	98023-4-1	42.0	53.5	47.8	55.0	57.0	429	530
246	98076-9-1	51.8	43.7	47.8	60.5	60.8	425	524
82	98023-1-1	50.2	45.1	47.7	59.4	60.6	427	525
316	98093-6-3	53.8	41.6	47.7	59.1	59.0	422	525
343	98097-7-1	53.1	42.2	47.6	59.1	59.4	429	525
325	98096-1-1	57.8	37.4	47.6	57.0	59.5	429	527
348	98098-9-1	64.9	29.9	47.4	57.7	55.8	422	524
217	98068-10-1	44.4	50.3	47.4	56.0	57.7	433	531
83	98023-1-2	37.9	56.6	47.3	58.4	60.8	427	526
25	98006-5-2	52.5	41.9	47.2	57.7	56.5	425	522
64	98021-11-3	63.9	30.4	47.1	58.4	59.1	429	
38	98011-8-3	64.9	29.4	47.1	57.9	58.0	421	524
54	98018-6-1	52.8	41.3	47.0	59.4	59.8	425	525
117	98030-5-1	36.0	57.7	46.9	55.0	58.5	429	526
394	98109-4-3	61.3	32.4	46.9	55.0	58.2	433	527
345	98098-5-1	57.8	35.8	46.8	58.6	56.7	425	525
9	98003-2-1	44.9	48.6	46.8	57.6	57.4	428	525
432	98121-12-2	33.2	60.2	46.7	56.1	57.4	433	530
80	98022-19-3	40.4	52.9	46.6	58.1	58.6	429	526
26	98006-6-1	66.8	26.5	46.6	57.5	55.8	423	523
465	98172-7-1	24.9	68.4	46.6	55.6	56.9	427	527
334	98096-7-1	58.0	35.1	46.6	58.4	57.4	425	527
453	98158-3-1	69.7	23.3	46.5	60.5	56.5	422	524
268	98082-19-1	45.9	46.9	46.4	59.3	56.1	425	524
37	98011-8-2	75.2	17.3	46.2	59.2	59.0	421	524
180	98048-1-1	59.0	33.4	46.2	58.8	58.6	423	524
360	98103-5-1	65.4	27.0	46.2	60.6	58.1	422	523
113	98030-1-2	35.4	56.8	46.1	55.0	58.9	432	526
148	98040-4-3	43.9	47.4	45.6	60.1	58.4	433	530
123	98036-2-1	58.7	32.1	45.4	53.2	60.9	427	525
153	98040-6-2	51.2	39.6	45.4	57.4	61.2	435	528
138	98040-2-2	51.4	39.3	45.4	61.0	60.3	423	525
182	98048-1-2	64.5	26.2	45.4	58.6	59.8	429	527
385	98108-3-2	59.9	30.8	45.4	56.0	57.2	427	527
20	98005-1-4	56.8	33.9	45.3	59.2	56.2	420	521
283	98084-2-1	41.3	49.4	45.3	58.8	59.5	422	525
263	98082-5-1	54.2	36.4	45.3	57.9	58.7	425	525
459	98159-8-1	75.2	15.4	45.3	59.6	59.1	423	526
51	AR910	51.3	38.9	45.1	59.2	59.7	422	524
454	98158-3-2	77.3	12.9	45.1	59.2	56.0	422	524
439	98131-1-1	50.3	39.8	45.1	58.7	58.1	425	525
78	98022-19-1	41.1	48.9	45.0	57.2	59.8	433	525
382	98108-1-1	64.4	25.5	44.9	58.6	58.2	423	526
216	98068-4-3	43.5	46.2	44.8	56.8	57.6	433	531
48	98017-2-1	57.8	31.8	44.8	59.8	60.4	428	527
115	98030-1-4	37.1	52.5	44.8	55.0	59.1	427	526
222	98070-7-1	42.1	47.4	44.8	58.6	59.1	425	525
247	98077-2-1	62.1	27.3	44.7	50.5	57.7	422	525

Table 3. Performance of breeding lines and checks in the Wheat Observation Yield Nursery in 2005 at Stuttgart and Keiser.

Entry #	Entry Name	Yield			Test Weight		Head date	Mature date
		Keiser	Stutt	Avg	Stutt	Keiser		
		-----bu/A-----			-----lb/bu-----			
32	98011-4-1	62.7	26.8	44.7	56.7	54.2	422	524
27	98008-4-1	61.3	28.0	44.6	57.0	56.3	425	522
2	98001-4-1	63.0	26.2	44.6	57.2	57.3	423	525
342	98097-6-2	39.8	49.2	44.5	59.1	59.7	429	525
403	98109-9-4	32.5	56.3	44.4	56.2	56.9	433	527
114	98030-1-3	31.9	57.0	44.4	56.0	59.0	432	526
304	98089-2-2	44.2	44.1	44.2	59.1	57.2	429	526
386	98109-2-1	64.3	24.0	44.1	55.4	58.8	433	527
7	98011-6-2	57.3	30.7	44.0	56.7	54.0	420	523
112	98030-1-1	27.4	60.4	43.9	55.7	58.9	429	526
413	98114-1-1	63.0	24.8	43.9	58.6	58.4	422	525
243	98075-5-2	68.6	19.1	43.9	57.9	61.0	425	531
154	98040-6-3	47.6	39.7	43.7	57.7	60.5	434	528
149	98040-5-1	46.4	40.6	43.5	59.4	60.4	427	527
24	98006-5-1	50.9	35.8	43.4	57.7	57.0	425	522
47	98014-12-4	46.6	40.1	43.4	61.7	62.2	427	525
79	98022-19-2	30.9	55.7	43.3	58.4	59.6	433	526
39	98011-10-1	64.8	21.7	43.3	57.9	55.1	425	524
323	98094-8-1	50.8	35.7	43.2	59.7	57.9	422	522
396	98109-8-1	65.3	21.0	43.2	58.2	60.6	425	525
42	98013-4-1	51.9	34.2	43.1	57.1	58.5	427	525
398	98109-8-3	65.6	20.3	42.9	57.4	59.3	425	527
399	98109-9-1	66.0	19.6	42.8	56.9	57.9	432	530
421	PAT	53.1	32.5	42.8	59.0	59.6	436	530
275	98083-6-1	51.4	33.9	42.6	56.9	59.8	433	528
238	98075-2-1	36.1	49.0	42.6	59.0	57.6	435	531
471	AR910	61.7	23.2	42.4	58.6	57.6	421	524
99	98025-3-1	49.0	35.6	42.3	56.6	58.9	433	530
147	98040-4-2	43.2	41.2	42.2	60.6	62.2	423	525
418	98119-5-1	63.4	20.6	42.0	58.5	58.6	429	527
120	98030-6-1	56.0	27.9	42.0	57.7	57.5	422	524
76	98022-5-1	32.8	50.8	41.8	58.4	58.2	429	529
447	98152-7-1	60.5	23.0	41.7	59.8	59.0	423	527
207	98063-3-1	30.2	53.0	41.6	55.3	57.7	433	531
34	98011-4-3	63.9	19.2	41.6	56.6	56.4	422	524
55	98018-6-2	39.5	43.6	41.6	58.9	58.1	432	528
124	98036-2-2	53.6	29.5	41.5	58.1	60.0	427	525
59	98072-3-1	82.9	.	41.5	.	59.1	417	522
14	98003-4-3	63.0	19.9	41.5	61.6	59.6	418	521
248	98077-4-1	39.6	43.2	41.4	57.9	57.7	433	528
136	98040-1-3	42.5	40.2	41.4	61.0	60.6	428	525
452	98152-9-3	57.8	24.8	41.3	59.8	58.9	427	524
44	98014-12-1	42.5	40.1	41.3	61.5	61.6	427	525
374	98106-11-1	46.0	36.6	41.3	59.1	59.7	424	527
84	98023-2-1	43.5	38.9	41.2	57.9	56.5	420	521
445	98152-5-1	70.8	11.4	41.1	60.1	59.8	423	527
121	PAT	60.7	21.3	41.0	45.6	59.1	433	531
451	PAT	42.6	39.3	40.9	58.9	58.7	435	527

Table 3. Performance of breeding lines and checks in the Wheat Observation Yield Nursery in 2005 at Stuttgart and Keiser.

Entry #	Entry Name	Yield			Test Weight		Head date	Mature date
		Keiser	Stutt	Avg	Stutt	Keiser		
		-----bu/A-----			-----lb/bu-----			
349	98098-10-1	49.8	31.9	40.9	57.4	57.3	427	530
132	98039-2-1	40.9	40.8	40.8	55.6	58.1	436	531
158	98041-2-1	35.8	45.8	40.8	57.7	58.8	427	525
414	98115-3-1	63.6	17.9	40.7	60.9	58.4	422	524
347	98098-6-2	48.5	32.8	40.7	58.7	57.1	422	524
53	98018-3-1	39.2	42.0	40.6	58.6	59.8	432	528
392	98109-4-1	55.5	25.7	40.6	55.5	57.0	433	527
353	98098-13-1	58.3	22.7	40.5	58.4	56.7	421	524
146	98040-4-1	39.5	41.3	40.4	59.8	62.0	423	525
135	98040-1-2	42.9	37.8	40.4	60.1	60.0	432	524
448	98152-8-1	60.1	20.5	40.3	59.6	58.0	423	525
375	98106-12-1	55.6	24.9	40.3	60.2	59.5	421	525
152	98040-6-1	46.3	33.7	40.0	57.2	60.8	435	528
322	98094-7-2	47.6	32.3	39.9	58.4	56.2	418	522
33	98011-4-2	60.7	18.8	39.8	57.7	55.2	422	524
356	98100-7-2	44.4	35.0	39.7	57.9	59.1	435	530
69	98021-14-1	39.0	40.4	39.7	57.7	57.9	427	525
130	98036-4-4	56.2	23.1	39.7	60.3	60.3	429	527
100	98025-3-2	41.7	37.3	39.5	56.2	58.0	436	530
460	98172-1-1	73.2	5.4	39.3	.	57.4	427	528
218	98068-10-2	42.8	35.7	39.3	58.7	57.5	429	531
116	98030-4-1	40.8	37.6	39.2	58.0	59.0	427	525
74	98022-1-2	26.1	52.2	39.1	57.6	58.3	434	528
93	98023-6-2	78.2	.	39.1	.	56.2	425	526
455	98159-1-1	47.9	30.3	39.1	58.2	62.1	425	525
206	98061-4-1	46.9	30.5	38.7	57.7	56.4	421	525
90	98023-5-3	77.3	.	38.7	.	57.4	425	526
388	98109-2-3	39.8	37.4	38.6	55.0	57.7	435	531
70	98021-14-2	33.6	43.5	38.5	57.7	57.9	426	526
273	98083-1-4	41.0	35.8	38.4	59.6	57.7	429	531
45	98014-12-2	35.7	40.9	38.3	60.9	61.0	428	525
373	98106-8-3	49.3	27.2	38.3	59.1	60.3	425	531
150	98040-5-2	44.6	31.8	38.2	60.1	60.2	427	525
92	98023-6-1	76.1	.	38.1	.	56.8	425	526
311	SABBE	14.7	61.0	37.9	57.1	56.0	433	531
389	98109-2-4	49.2	26.4	37.8	56.5	60.6	435	530
159	98041-3-1	46.6	28.7	37.7	59.3	59.7	421	523
469	98214-2-1	37.4	37.8	37.6	57.7	56.8	427	526
415	98119-2-1	40.1	34.8	37.5	58.4	60.1	435	527
235	98072-2-3	30.8	44.0	37.4	59.6	57.0	433	531
165	98043-2-1	26.1	48.3	37.2	58.6	59.4	436	527
199	98060-2-1	27.8	46.6	37.2	59.0	56.8	427	525
355	98100-7-1	44.2	30.1	37.2	57.8	60.1	435	531
62	98021-11-1	74.3	.	37.1	.	60.3	425	525
208	98066-1-1	27.5	46.8	37.1	59.6	57.5	433	531
127	98036-4-1	28.4	45.3	36.9	58.4	60.0	435	530
58	98021-6-1	40.8	32.5	36.7	58.7	59.6	425	524
409	98112-4-2	45.6	27.8	36.7	57.8	58.6	423	525

Table 3. Performance of breeding lines and checks in the Wheat Observation Yield Nursery in 2005 at Stuttgart and Keiser.

Entry #	Entry Name	Yield			Test Weight		Head date	Mature date
		Keiser	Stutt	Avg	Stutt	Keiser		
		-----bu/A-----			-----lb/bu-----			
46	98014-12-3	43.0	30.1	36.6	61.7	61.7	427	525
267	98082-15-1	27.0	46.0	36.5	57.6	56.7	435	531
1	PAT	42.9	29.9	36.4	58.1	58.4	435	528
91	PAT	72.8	.	36.4	.	59.3	433	530
264	98082-10-1	32.9	39.8	36.4	59.8	57.5	435	531
142	98040-3-1	26.0	46.8	36.4	61.3	57.6	434	525
253	98079-6-1	28.1	44.6	36.3	58.4	57.7	435	531
423	98119-7-1	46.6	25.9	36.2	56.6	53.9	433	530
265	98082-11-1	26.4	45.8	36.1	58.6	56.5	433	531
119	98030-5-3	31.3	40.7	36.0	54.9	57.6	433	526
43	98013-6-1	40.2	31.7	35.9	58.4	58.3	428	524
428	98121-7-1	48.0	23.8	35.9	60.9	57.9	433	530
162	98041-8-1	29.4	42.4	35.9	60.8	59.2	432	525
344	98097-7-2	34.2	37.1	35.7	59.7	59.1	429	525
137	98040-2-1	36.1	35.1	35.6	61.6	60.5	422	522
485	98216-14-2	57.1	14.1	35.6	59.2	59.1	422	525
160	98041-5-1	27.6	43.4	35.5	60.5	58.6	427	523
94	98023-7-1	38.6	32.3	35.5	57.2	56.2	423	523
245	98076-3-1	42.3	28.5	35.4	58.4	59.6	425	525
16	98003-7-2	24.4	46.4	35.4	60.5	57.2	427	524
213	98068-3-1	48.0	22.7	35.4	58.2	61.3	429	527
227	98071-1-1	46.4	23.8	35.1	57.4	56.1	425	527
354	98100-3-1	48.0	22.1	35.0	60.7	61.1	427	528
31	PAT	69.4	.	34.7	.	59.1	432	530
252	98079-4-1	27.3	42.0	34.7	59.6	57.4	436	531
12	98003-4-1	34.7	34.5	34.6	60.2	57.3	418	521
419	98119-5-2	45.5	23.6	34.5	58.5	58.6	435	530
435	98127-1-2	46.7	22.3	34.5	61.3	57.2	422	526
186	98055-1-1	28.9	39.9	34.4	54.9	57.3	435	531
251	SABBE	23.1	45.7	34.4	56.6	57.4	433	531
209	98066-5-1	30.3	38.4	34.3	58.4	57.6	429	531
220	98070-6-1	14.5	54.1	34.3	58.1	55.7	437	528
193	98055-9-2	25.9	42.4	34.2	59.5	59.1	438	532
166	98043-4-1	19.6	48.5	34.0	59.4	59.3	433	525
145	98040-3-4	27.1	40.9	34.0	61.2	56.9	433	529
436	98127-2-1	35.6	32.3	34.0	59.7	58.4	429	531
250	98078-4-1	23.3	44.6	34.0	58.6	56.7	436	531
50	98017-2-3	20.6	47.1	33.8	59.9	57.2	432	524
468	98179-9-1	26.8	40.8	33.8	57.9	57.2	429	527
456	98159-3-1	48.3	19.3	33.8	58.8	57.1	435	531
175	98046-6-3	24.3	42.9	33.6	60.1	57.5	429	531
266	98082-11-2	26.1	41.0	33.5	58.6	56.6	435	531
71	SABBE	22.4	44.7	33.5	57.4	57.0	435	
255	98080-4-1	24.6	42.3	33.5	57.4	57.2	435	531
168	98045-1-1	17.9	48.9	33.4	59.8	56.7	433	531
306	98083-6-2	41.6	24.8	33.2	57.1	57.8	427	526
239	98075-3-1	28.7	37.4	33.0	59.1	57.4	435	531
203	98060-6-2	13.1	53.0	33.0	57.2	59.2	435	531

Table 3. Performance of breeding lines and checks in the Wheat Observation Yield Nursery in 2005 at Stuttgart and Keiser.

Entry #	Entry Name	Yield			Test Weight		Head date	Mature date
		Keiser	Stutt	Avg	Stutt	Keiser		
		-----bu/A-----			-----lb/bu-----			
457	98159-5-1	44.8	21.0	32.9	60.1	57.3	435	531
191	SABBE	15.0	50.9	32.9	57.2	56.5	435	531
384	98108-3-1	36.2	29.4	32.8	56.3	57.7	436	531
187	98055-4-1	29.5	35.9	32.7	59.0	56.5	433	531
424	98120-3-1	34.9	30.4	32.6	60.5	56.9	429	528
19	98005-1-3	21.5	43.8	32.6	57.7	57.0	428	526
416	98119-2-2	43.1	21.8	32.4	58.6	59.9	429	527
387	98109-2-2	33.2	31.7	32.4	55.2	56.3	435	531
73	98022-1-1	17.1	47.7	32.4	57.7	57.0	434	531
249	98078-3-1	23.3	41.3	32.3	59.3	57.0	435	531
134	98040-1-1	34.1	30.2	32.1	59.0	60.5	428	523
170	98045-2-1	23.5	40.5	32.0	60.9	56.8	433	528
427	98120-3-4	44.8	19.1	32.0	60.1	61.0	427	527
221	SABBE	11.9	51.5	31.7	56.5	56.2	437	526
95	98023-7-2	40.6	22.8	31.7	57.3	56.5	423	523
393	98109-4-2	32.2	31.0	31.6	54.2	57.0	435	531
262	98082-3-1	22.1	41.1	31.6	54.8	56.6	435	531
196	98058-4-1	13.9	49.3	31.6	58.1	56.8	436	531
144	98040-3-3	25.9	37.1	31.5	61.3	57.6	434	530
260	98082-1-4	23.5	39.4	31.4	58.4	57.2	435	531
125	98036-2-3	32.0	30.8	31.4	60.3	57.1	429	526
336	98097-2-1	40.1	22.7	31.4	60.2	57.1	429	527
219	98070-3-1	18.8	43.9	31.3	55.9	56.5	435	530
237	98072-6-1	31.1	31.5	31.3	59.3	58.6	425	525
101	SABBE	30.1	32.3	31.2	57.2	57.4	435	530
318	98094-2-2	28.6	33.8	31.2	60.3	59.8	427	525
57	98021-4-1	21.9	40.4	31.1	58.2	56.7	432	531
229	98071-2-2	28.6	33.2	30.9	57.0	56.4	433	525
230	98071-2-3	26.8	34.7	30.8	59.0	56.9	429	525
281	SABBE	23.0	37.9	30.4	56.9	56.5	433	531
484	98216-14-1	47.1	13.5	30.3	60.2	61.3	429	533
319	98094-5-1	17.8	42.7	30.2	58.9	56.4	434	531
96	98025-2-1	32.5	27.9	30.2	57.0	59.0	426	529
236	98072-4-1	23.3	37.0	30.2	59.6	56.8	435	531
466	98179-2-1	20.8	39.1	29.9	57.9	57.9	427	525
163	98042-2-1	26.7	33.2	29.9	57.3	59.3	435	529
258	98082-1-2	16.0	43.8	29.9	57.9	57.1	435	531
315	98093-6-2	15.2	44.6	29.9	58.9	56.7	432	531
379	98107-4-2	14.2	45.5	29.9	58.6	.	435	527
131	SABBE	18.5	41.1	29.8	57.9	56.5	435	531
8	98003-1-4	7.0	52.5	29.8	56.9	.	436	528
228	98071-2-1	17.2	42.3	29.7	58.6	28.3	433	527
274	98083-5-1	38.2	21.0	29.6	59.1	57.4	432	531
362	98103-7-1	40.6	18.6	29.6	58.2	59.8	425	525
446	98152-6-1	32.4	26.7	29.5	59.8	57.1	429	528
440	98148-2-1	39.2	19.6	29.4	60.9	58.9	423	528
475	98216-2-1	33.1	25.7	29.4	59.1	55.3	423	526
232	98072-1-1	24.6	33.9	29.2	60.1	56.7	435	531

Table 3. Performance of breeding lines and checks in the Wheat Observation Yield Nursery in 2005 at Stuttgart and Keiser.

Entry #	Entry Name	Yield			Test Weight		Head date	Mature date
		Keiser	Stutt	Avg	Stutt	Keiser		
		-----bu/A-----			-----lb/bu-----			
190	98055-5-3	17.7	40.6	29.1	58.3	56.7	437	531
395	98109-4-4	33.6	24.6	29.1	53.6	56.7	434	530
223	98070-7-2	14.5	43.7	29.1	58.0	56.0	435	531
185	98053-1-2	29.8	28.2	29.0	55.2	57.9	433	531
140	98040-2-4	14.5	43.5	29.0	60.9	57.0	435	531
357	98102-6-1	18.1	39.6	28.8	60.1	59.9	435	531
18	98005-1-2	22.5	35.2	28.8	58.6	56.8	432	527
425	98120-3-2	38.6	18.8	28.7	60.1	56.9	429	528
205	98061-2-1	21.1	36.0	28.6	58.4	56.9	435	531
363	98103-8-1	31.5	25.6	28.6	60.9	57.5	433	528
305	98092-2-1	37.9	19.1	28.5	59.3	57.2	429	526
198	98058-6-2	10.0	47.0	28.5	58.9	54.8	437	531
61	PAT	57.0	.	28.5	.	59.1	433	531
294	98088-2-2	19.1	37.8	28.4	59.0	56.2	437	525
104	98025-5-2	17.0	39.8	28.4	56.8	57.8	436	531
110	98026-11-3	18.2	38.5	28.4	59.3	57.4	433	526
56	98020-1-1	14.7	41.6	28.1	59.3	57.7	427	524
102	98025-4-1	27.9	28.3	28.1	56.8	60.2	436	531
202	98060-6-1	7.0	49.0	28.0	57.2	0.0	436	531
143	98040-3-2	21.0	34.9	28.0	60.9	56.9	434	530
380	98107-8-1	17.1	38.8	27.9	59.2	59.3	437	527
97	98025-2-2	26.8	28.9	27.9	58.7	59.8	427	528
254	98080-2-1	22.5	33.2	27.8	58.9	57.4	437	531
108	98026-11-1	19.8	35.7	27.7	59.3	57.2	433	525
408	98112-4-1	38.0	17.1	27.6	57.4	57.7	423	525
157	98041-1-2	11.8	43.3	27.6	59.8	57.5	435	528
109	98026-11-2	20.7	33.7	27.2	58.5	57.7	434	526
194	98055-10-1	11.7	42.5	27.1	59.6	56.5	435	531
482	98216-11-1	39.9	13.9	26.9	59.5	59.0	427	530
22	98006-4-1	18.8	34.9	26.8	58.3	56.3	427	526
36	98011-8-1	26.2	27.4	26.8	58.4	57.2	433	531
155	98040-6-4	33.1	20.4	26.8	58.0	60.7	434	525
358	98102-6-2	26.0	27.5	26.7	59.9	60.1	435	531
287	98086-1-1	15.2	38.2	26.7	57.3	56.0	435	531
184	98053-1-1	32.6	20.5	26.6	51.5	58.9	429	532
28	98008-6-1	52.8	.	26.4	.	54.6	422	523
105	98025-5-3	16.6	36.1	26.4	57.3	56.4	436	531
41	SABBE	9.8	42.8	26.3	57.0	.	433	531
6	98003-1-2	10.5	41.8	26.1	57.4	27.7	435	530
286	98084-4-3	16.1	36.2	26.1	58.9	56.8	435	531
256	98080-6-1	17.6	34.5	26.0	58.1	57.4	437	531
397	98109-8-2	27.6	24.4	26.0	58.1	57.7	429	529
479	98216-7-2	41.2	10.8	26.0	58.9	58.5	422	526
417	98119-2-3	27.6	24.3	26.0	57.9	59.9	435	530
429	98121-8-1	40.5	10.9	25.7	.	57.2	433	530
483	98216-12-1	33.0	18.2	25.6	60.2	59.0	427	531
449	98152-9-1	29.4	21.6	25.5	60.4	56.5	435	527
167	98043-6-1	9.4	41.5	25.5	59.9	54.8	435	531

Table 3. Performance of breeding lines and checks in the Wheat Observation Yield Nursery in 2005 at Stuttgart and Keiser.

Entry #	Entry Name	Yield			Test Weight		Head date	Mature date
		Keiser	Stutt	Avg	Stutt	Keiser		
		-----bu/A-----			-----lb/bu-----			
200	98060-5-1	7.3	43.6	25.5	59.2	.	437	531
477	98084-2-2	34.2	16.6	25.4	59.6	58.3	425	525
289	98086-3-2	10.2	40.6	25.4	57.2	56.8	438	532
189	98055-5-2	14.8	36.0	25.4	58.0	57.1	435	531
23	98006-4-2	17.0	33.5	25.3	60.1	56.4	427	524
204	98060-6-3	13.1	37.3	25.2	56.2	57.0	435	531
98	98025-2-3	21.1	29.2	25.2	58.5	59.5	427	529
10	98003-2-2	2.4	47.7	25.0	57.4	.	438	528
420	98119-6-1	29.9	20.1	25.0	60.3	57.1	435	531
72	98021-14-3	14.7	35.3	25.0	57.3	58.1	429	
156	98041-1-1	15.9	33.9	24.9	59.5	57.5	429	527
197	98058-6-1	11.4	38.1	24.8	58.5	55.8	435	531
317	98094-2-1	11.8	37.7	24.8	59.7	56.8	433	531
426	98120-3-3	34.2	15.0	24.6	61.2	61.0	429	525
438	98127-2-3	18.9	30.0	24.5	59.8	56.1	435	531
106	98025-5-4	19.1	29.8	24.4	57.6	58.1	437	531
467	98179-2-2	14.6	34.3	24.4	58.4	57.4	427	525
288	98086-3-1	11.2	37.6	24.4	57.2	28.4	438	532
376	98106-12-2	11.1	37.5	24.3	60.0	.	435	531
470	98214-2-2	27.6	20.7	24.2	56.5	56.0	427	526
126	98036-2-4	9.7	38.6	24.1	59.6	55.4	436	530
405	98112-1-2	29.7	18.6	24.1	52.0	52.7	438	533
122	98032-8-1	32.3	16.0	24.1	43.6	57.6	433	526
437	98127-2-2	14.3	33.9	24.1	59.5	55.5	435	531
443	98152-3-1	23.4	24.8	24.1	60.1	56.2	433	528
404	98112-1-1	33.7	14.0	23.9	51.7	54.1	438	533
161	SABBE	12.2	35.5	23.8	57.4	56.1	435	525
410	98112-4-3	15.1	32.4	23.7	57.8	55.5	433	527
480	98216-10-1	33.1	14.1	23.6	59.6	58.4	427	531
422	98119-6-2	31.8	15.2	23.5	60.1	56.8	433	530
412	98112-4-4	23.5	20.4	22.0	58.4	56.2	433	527
103	98025-5-1	16.7	27.0	21.9	57.4	58.9	436	531
430	98121-12-1	41.5	2.1	21.8	.	57.7	425	525
188	98055-5-1	14.7	27.8	21.3	59.4	55.8	435	531
346	98098-6-1	5.7	36.7	21.2	58.8	.	436	531
30	98011-2-1	42.1	.	21.0	.	58.2	427	525
195	98055-11-1	12.4	28.3	20.3	57.3	55.0	436	530
192	98055-9-1	10.1	29.4	19.7	60.4	56.4	437	531
133	98039-2-2	10.3	29.0	19.7	54.9	52.4	436	533
476	98216-4-1	28.6	10.6	19.6	57.2	54.9	427	524
40	98011-11-1	8.1	30.9	19.5	56.6	.	433	531
11	SABBE	6.1	32.6	19.3	57.1	.	432	530
407	98112-3-2	21.0	14.9	18.0	56.0	57.7	437	532
478	98216-7-1	16.9	18.9	17.9	59.2	28.0	427	527
164	98043-1-1	20.5	14.7	17.6	59.5	57.3	427	525
60	98021-6-3	34.5	.	17.3	.	57.8	433	530
29	98008-6-2	33.2	.	16.6	.	57.6	427	525
461	SABBE	32.8	0.3	16.5	.	56.9	435	531

Table 3. Performance of breeding lines and checks in the Wheat Observation Yield Nursery in 2005 at Stuttgart and Keiser.

Entry #	Entry Name	Yield			Test Weight		Head date	Mature date
		Keiser	Stutt	Avg	Stutt	Keiser		
		-----bu/A-----			-----lb/bu-----			
406	98112-3-1	21.1	11.6	16.4	57.1	57.7	437	532
107	98026-9-1	6.2	26.3	16.3	61.3	.	437	531
487	98225-3-2	17.2	13.0	15.1	58.8	57.9	429	526
472	98215-1-1	11.9	17.9	14.9	60.6	57.2	427	526
486	98225-3-1	16.7	12.9	14.8	59.3	58.6	429	526
473	98215-1-2	12.0	14.6	13.3	60.1	58.2	427	526
474	98215-3-1	8.3	18.2	13.3	59.8	.	427	526

Table 4. Performance of lines in Scab Nursery at Hope in 2005.

Entry Name	Yield	Test wt
	bu/A	lb/bu
AR850-1-1	76.9	58.3
PAT	76.1	58.6
AR97124-4-3	75.8	47.6
AR97124-4-2	73.1	56.4
M0981020	72.8	57.7
AR97124-4-1	71.7	58.2
AR97048-7-2	70.1	57.7
AR97048-9-1	69.2	56.4
AR97048-1-1	69.0	58.2
AR97048-4-1	68.7	49.2
TRUMAN	67.8	56.7
AR97007-12-1	67.7	53.8
AR96077-7-2	64.8	56.6
AR93095-4-1	64.3	56.8
MO980829	64.0	56.4
AR97007-7-2	63.6	46.2
ERNIE	62.4	57.9
AR97002-10-1	62.0	57.3
AR97002-2-1	61.7	46.5
AR97002-10-2	61.2	56.1
AR97070-7-1	59.2	58.2
AR97007-7-1	58.5	56.4
AR97048-7-1	58.5	58.1
AR97048-8-1	57.2	48.8
AR97007-8-1	57.1	55.2
AR97147-4-3	55.8	59.2
AR97147-4-2	55.3	59.4
AR97007-8-2	54.2	46.9
AR922-5-1	54.1	56.6
AR93035-4-1	52.2	57.7
AR97002-2-2	52.1	55.0
AR93095-4-1	51.3	57.3
AR93019-2-1	51.2	60.2
AR97007-4-1	50.9	55.2
AR97124-7-1	50.6	56.2
AR93027-3-2	49.4	56.7
AR93027-5-1	48.2	57.0
AR857-1-2	47.0	58.3
AR97147-4-1	46.9	58.4
AR857-1-1	29.9	56.7

Table 5. Performance of lines in Scab Nursery at Marianna in 2005.

Entry Name	Yield	Test wt	Ldg	Heading date	Stand
	bu/A	lb/bu	in		%
AR97048-1-1	70.4	59.6	39	415	73
AR93035-4-1	69.4	60.2	36	419	80
AR97048-7-1	65.2	60.2	35	418	57
AR97048-4-1	65.2	60.5	38	417	63
AR97007-4-1	63.1	58.0	31	411	63
AR97124-4-3	62.1	58.8	39	418	60
AR97048-8-1	61.8	58.7	38	419	67
AR97124-7-1	61.3	58.2	35	419	60
AR96077-7-2	60.4	58.3	30	414	82
AR97124-4-2	59.9	59.1	36	419	65
AR97048-9-1	59.9	59.9	39	417	77
TRUMAN	59.5	58.0	38	.	70
M0981020	58.9	58.6	34	.	82
AR97048-7-2	58.8	60.1	37	419	73
AR97007-8-1	58.2	56.3	34	419	58
AR93027-3-2	58.0	59.1	32	417	80
MO980829	57.3	58.2	39	.	77
AR922-5-1	57.1	59.1	38	415	73
AR97002-2-2	56.0	56.5	28	410	80
PAT	55.6	58.2	33	.	80
AR93095-4-1	55.4	58.6	40	417	57
AR97007-7-2	54.9	56.9	34	416	65
AR97147-4-1	54.8	61.0	36	.	53
AR97002-10-2	53.3	57.5	34	.	55
AR97007-8-2	53.1	58.4	33	418	60
AR93095-4-1	52.1	58.9	37	418	68
AR97124-4-1	51.1	59.1	30	418	67
AR93019-2-1	49.6	62.3	36	418	65
AR97002-2-1	49.5	57.7	28	410	67
AR850-1-1	49.3	58.8	32	.	73
AR93027-5-1	47.8	59.9	34	418	63
AR97147-4-3	46.3	61.0	40	.	40
AR97002-10-1	45.8	57.1	33	.	53
AR97007-7-1	45.3	55.8	34	415	57
ERNIE	44.6	58.8	33	.	63
AR97070-7-1	43.7	61.2	42	.	47
AR97147-4-2	42.7	61.4	40	.	43
AR857-1-2	41.0	60.7	37	411	67
AR97007-12-1	33.1	57.7	35	418	43
AR857-1-1	18.7	57.9	41	409	43

3) EARLY GENERATIONS

During the winter the greenhouse crossing program to produce future lines was continued. There were 113 successful crosses in four efforts: 1) standard variety development, 2) scab-resistant varieties, 3) imidazolinone herbicide resistant varieties and, 4) specialty types (white and waxy wheats). The resulting offspring of last year's crosses (109 F₁) were grown in the greenhouse over the winter to increase seed. The next three generations (F₂, F₃, and F₄) were grown as bulk populations in the field at Stuttgart. This year there were 196 F₂ populations, 159 F₃ populations, 172 F₄ populations and 175 F₅ populations produced. Individual plants were selected from the F₆ generation at Fayetteville to produce experimental lines which will be planted at Stuttgart and Keiser this fall to begin yield testing.

Table 6. List of crosses made in the greenhouse during the winter of 2005.

97002-2-1/TERRAL TV 8450	BERETTA/AR93035-4-1
981542A1-10-4-5-3/VA00W-526	BERETTA/AR96141-4-1
981542A1-10-4-5-3/VAN98W-342	BERETTA/CO2W-10
AGS-2050/CO2W-24	BERETTA/CO2W-21
AGS-2050/DELIVER	BERETTA/ENDURANCE
AGS-2050/P961341A3-1-2	BERETTA/P961341A-3-2-2
AR800-1-2-1/VAN98W-342	BERETTA/PAT
AR800-1-3-1/CO2W-32	BERETTA/TERRAL TV 8450
AR800-1-3-1/ENDURANCE	BERETTA/TERRAL TV 8450
AR800-1-3-1/ENDURANCE	BERETTA/UGA951079-2E31
AR910-9-1/CO2W-8	BERETTA/VA00W-526
AR910-9-1/CO2W-34	BERETTA/VA00W-526
AR910-9-1/GENESIS M86	BERETTA/VAFE24-4-6
AR910-9-1/P96134A3-1-2	CO2W-1/AR93035-4-1
AR910-9-1/VA00W-526	CO2W-2/AR96052-4-2
AR910-9-1/VAN98W-342	CO2W-3/VA00W-526
AR9141-4-1/VA00W-526	CO2W-5/COKER 9663
AR93035-4-1/VA00W-526	CO2W-10/VAFE24-4-6
AR93035-4-1/VA00W-526	CO2W-24/BERETTA
AR96052-4-2/BERETTA	CO2W-24/MO981020
AR96052-4-2/CO2W-29	CO2W-31/TERRAL 8450
AR96052-4-2/COKER9663	CO2W-32/P961341A-3-1
AR96052-4-2/COKER9663	COKER 9663/AR910-9-1
AR96052-4-2/ENDURANCE	COKER 9663/AR93035-4-1
AR96052-4-2/P96134A3-1-2	COKER 9663/AR96141-4-1
AR96052-4-2/VA00W-526	COKER 9663/CO2W-22
AR96077-7-2/VAN98W-342	COKER 9663/CO2W-29
AR96141-4-1/BERETTA	COKER 9663/DELIVER
AR96141-4-1/CO2W-3	DELIVER/CO2W-24
AR96141-4-1/DELIVER	DELIVER/PAT
AR96141-4-1/P961341A3-1-2	ENDURANCE/AR800-1-3-1
AR96141-4-1/VAN98W-342	ENDURANCE/AR800-1-3-1
AR96141-4-1/VAN98W-342	GA971127-14-6/981542A1-10-4-5-3

GA971127-14-6-6/PAT
GENESIS/CO2W-4
GENESIS M86/CO2W-7
GENESIS M86/VAN-98W-342
GENESIS M86/VAN-98W-342
MO981020/AR96052-4-2
MO981020/P961341A-1-2
MO981020/P961341A-1-2
MO981020/TERRALTV 8450
MO981020/UGA951079-2E31
P92226E2-5-3-2/AR910-9-1
P961341A3-1-2/AR800-13-1
P961341A3-1-2/AR93035-4-1
P961341A-3-1-2/CO2W-22
P961341A3-2-2/AR93035-4-1
P961341A-3-2-2/PAT
PAT/AGS 2050
PAT/AR96052-4-2
PAT/AR96141-4-1
PAT/CO2W-8
PAT/CO2W-24
PAT/DELIVER
PAT/MO981020
PAT/UC66049
PAT/VA-FE24-4-6
TERRAL 8565/981542A1-10-4-5-3
TERRAL 8450/AGRIPRO BERETTA
TERRAL TV 8450/BERETTA
TERRAL 8450/DELIVER
TERRAL 8450/DELIVER
TERRAL 8565/VA00W-526
UGA951079-2E31/CO2W-2
UGA951079-2E31/Deliver
VA00W-526/AR810-1-3-1
VA00W-526/AR93035-4-1
VA00W-526/AR93035-4-1
VA00W-526/AR96052-4-2
VA00W-526/BERETTA
VA00W-526/CO2W-22
VA00W-526/PAT
VA00W-526/UGA951019-2E31
VA00W-526/VA-FE24-5-11
VA01W-476/CO2W-4
VA-FE24-4-6/PAT
VAN98W-342/CO2W-7
VAN98W-342/MO981020

VAN98W-342/TERRAL 8450

CONCLUSIONS:

The breeding project has made strides in a number of areas. Approximately 800 experimental lines were tested throughout the state to determine genetic potential for Arkansas wheat producers. For future testing nearly 20,000 new lines were evaluated in the field. In order to produce new experimental lines, over 1000 genetically segregating populations were grown in the field as well as making over 100 crosses in the greenhouse to produce new populations. Some specific highlights from this year's work:

- Certified seed of Pat sold.
- AR 910 marketed as Delta King Seed GR9108.
- Three lines advanced to Regional Soft Wheat testing
- Breeding lines of herbicide-tolerant wheat for Hoelon-resistant ryegrass.
- Five scab resistant lines advanced for regional testing.
- Identification of lines resistant to stripe rust.
- Work in developing speciality (white and waxy) wheat for Arkansas continued.