

## **SPRING WHEAT VARIETY SCREENING IN THE KLAMATH BASIN**

R.L. Dovel, G. Chilcote, and B.A. Charlton<sup>1</sup>

### **A**bstract

Spring wheat breeding lines from the Oregon State University (OSU) and other regional breeding programs are evaluated annually at the Klamath Experiment Station (KES). Advanced selections also are screened at an organic soil site in the Lower Klamath Lake (LKL) area. Entries evaluated in 1999 included hard red (HR), soft white (SW), and hard white (HW) classes. In mineral soil at KES, SW varieties produced slightly higher yields than other classes. Pomerelle produced the highest yield of named varieties at 5,820 lb/acre. The numbered selection, 495006 achieved a significantly higher yield (6,040 lb/acre) than all other SW selections except Pomerelle in the OSU Elite Nursery. In the Western Regional Trial, Penewawa achieved the highest yield at 5,670 lb/acre. The Idaho selection IDO 506 was among the highest yielding entries in this trial in 1999 and ranked first in yield over 3 years. Leading SW varieties at the organic soil site were Alpowa and a Western Plant Breeders selection, WPB BZ 692-108.

Several HW selections produced significantly higher yield than the standard variety Klasic. IDO 523 ranked highest over 3 years in the Western Regional Trial and was among the highest

yielding HW selections in the Oregon Statewide Trial. OR4870453, released from the Oregon program as Winsome, was among the highest yielding HW entries at KES but was intermediate at the organic soil site. IDO 377S, which will be released by Idaho by Promar, produced a high yield at KES but a low yield at the LKL site.

Among HR entries, WPB 936 produced high yields at both sites in the Oregon Statewide Trial. Yecora Rojo, a standard variety grown commercially, produced low yields at both sites. Scarlet was the highest yielding HR variety at KES and among the high yielding lines at the LKL site. Several other promising selections were identified in each class in the OSU Elite Nursery Trials.

### **Introduction**

Wheat acreage has been limited in the Klamath Basin because spring frosts are generally more damaging for wheat than for barley or oats. However, the recent invasion of the region by barley stripe rust has resulted in some substitution of wheat for barley. The Klamath Irrigation Project crop report for 1999 indicates wheat accounted for nearly 18,000 acres. Total wheat production in the region may be more than 25,000 acres

---

<sup>1</sup>Former Associate Professor, Research Technician, and Faculty Research Assistant, respectively, Klamath Experiment Station, Klamath Falls, OR.

**Acknowledgments:** Appreciation is expressed to Henzel Farms for providing the trial site and crop care and to the Oregon Wheat Commission for financial support.

for 1999. Both hard red and soft white varieties are grown. The most common hard red varieties are Yecora Rojo and Westbred 936. Stephens, a soft white winter wheat, and Alpowa are the dominant soft white varieties. Alpowa tends to be late maturing. Frosts in late August damaged Alpowa in 1999, resulting in yield and quality reductions in this variety. This points out the need to identify cold-tolerant, short season varieties for the Klamath Basin.

Producers are continually seeking new marketing opportunities. Possible access to Asian noodle markets has generated interest in HW wheat. Quality HW wheat could command a premium price in Asian markets. Oregon is situated geographically in an advantageous position for this opportunity. The OSU wheat breeding program recently released Winsome (4870453), a HW variety with good end use quality that is very acceptable for this market niche.

Spring wheat screening trials conducted at KES in 1999 included: OSU Elite Nurseries for HR, SW, and HW selections; an Oregon Statewide Trial including all classes; and a Western Regional Trial including all classes. Only the Oregon Statewide Trial was conducted at the LKL organic soil site. All trials were conducted in cooperation with OSU and Western Regional plant breeding and evaluation programs.

### Procedures

#### KES

All spring wheat screening trials were conducted on a Poe fine sandy loam soil in a 3-year rotation following annual ryegrass and potatoes. All trials were

arranged in a randomized block design with four replications. Seed was planted at a 1-inch depth at 30 seeds/ft<sup>2</sup> with a Kincaid plot planter on May 5. Plots were 5 feet wide (10 rows at 6-inch spacing) and 20 feet long. Fertilizer included 20 lb N, 25 lb P<sub>2</sub>O<sub>5</sub>, and 16 lb S/acre banded at planting and 80 lb N, 48 lb P<sub>2</sub>O<sub>5</sub>, and 35 lb S/acre broadcast before planting. Weeds were controlled with Buctril (Bromoxynil) at 0.5 lb ai/acre and Romene (MCPA) at 0.5 lb ai/acre, applied with a conventional ground sprayer at the 4-leaf crop stage. Irrigation was applied according to crop needs with solid-set sprinklers arranged in a 40-foot by 40-foot pattern.

Grain was harvested on September 8 and 9 with a Hege plot combine with a 5-foot-wide header. Yields were recorded for all plots. Grain from the Oregon Statewide Trial was sent to Corvallis for determination of test weight, percent protein, and kernel weight on each sample. Test weights were determined for only one replication in OSU Elite Nursery and Western Regional Trials. Yield data were analyzed statistically with MSUSTAT software. Multi-year analyses used a split-plot design with year as the main plot and entry as the split-plot.

#### Lower Klamath Lake

The Oregon Statewide Spring Wheat Variety Trial was conducted on an Algoma silt loam soil in a continuous grain rotation. Grain was planted with a Kincaid plot planter on May 11. Seed was placed at a 1-inch depth at a seeding rate of 30 seeds/ft<sup>2</sup>. Fertilizer included 35 lb N/acre broadcast before planting and 40 lb N/acre and 50 lb P<sub>2</sub>O<sub>5</sub>/acre banded at planting. Weeds were controlled with a

tank mix of 2,4-D and Express (tribenuron-methyl) applied at recommended rates. Irrigation was applied as necessary to meet crop needs with a Zimatic overhead linear move system. Grain was harvested on September 20 with a Hege plot combine with a 5-foot-wide header. Grain yields were recorded for all plots. All samples were evaluated at Corvallis for test weight, percent protein, and kernel weight. All data were analyzed statistically using MSUSTAT software. Least significant differences (LSD) are based on *student's t* at the 5 percent probability level.

### Results and Discussion

#### *OSU Spring Wheat Elite Nurseries*

Five standard varieties and 20 numbered selections were included in the 1999 SW nursery. The numbered line 4950006 was significantly higher in yield than all other selections except Pomerelle (Table 1). Alpowa and 4950027 were the only other selections that produced 5,000 lb/acre. The test weight for 4950006 was among the highest of all entries. This entry was included in the 1998 trial, where it ranked second in yield (Table 2). It was first overall in yield for the 2-year mean. Over 3 years, 4850001 produced the highest yield. In 1999, this selection yielded 1,130 lb/acre less than 4950006.

The HR nursery included three standard varieties, the HW standard, Klasic, and 14 numbered HR selections (Table 3). Mean yields were about 650 lb/acre below yields in the SW trial. McKay, 4870410, and 4920028 produced significantly higher yields than the standard varieties Yecora Rojo and Westbred 936 in 1999 and significantly higher yields

than Yecora Rojo and Klasic in the 3-year average (Table 4). The HW variety, Klasic was similar in yield and test weight to Yecora Rojo and Westbred 936 in the 1999 trial.

The 1999 HW nursery included Klasic and 23 numbered selection (Table 5). Mean yields were similar to yields in the HR trial. All but two of the selections were equal to or higher in yield than Klasic. The highest yields were achieved by 942834 and 942505. The OSU selection 4870453 was released as Winsome in 2000. It was among the highest yielding lines in the 1999 trial and ranked first over 2 years (Table 6). Klasic ranked last among the seven selections evaluated in both 1997 and 1999. No data was obtained for the HW nursery in 1998 because of bird damage.

#### *Western Regional Spring Wheat Nursery*

The 1999 Western Regional Trial included 17 HR, 9 HW, and 13 SW selections. Mean yields were highest for the SW entries (Table 7). Penewawa produced the highest yield of all entries. IDO 526, IDO 506, and IDO 541 were not significantly lower in yield than Penewawa. Averaged over 3 year, IDO 506, IDO 523, and IDO 524 were similar in yield to Penewawa (Table 8). The standard variety Federation has produced low yields and low test weight each year. Its maturity is too late for Klamath Basin conditions.

CA 1162 produced the highest yield among HW entries in 1999 and 1998. It was the only selection to achieve 3 ton/acre yield in this trial in 1998. Klasic produced low yields in each year.

IDO 544, a new entry to the trial in

1999, achieved the highest yield among HR entries. It was the only entry with significantly higher yield than the standard variety, McKay. Over 3 years, Serra, SDM 50031, and SDM 50032 have been equal to McKay in yield.

### **Oregon Statewide Spring Wheat Trial (KES)**

The 1999 Oregon Statewide Trial included 13 SW, 7 HW, and 5 HR entries. Alpowa was evaluated with Gaucho (Imidacloprid) seed treatment, Adage (Novartis experimental compound) treatment, and untreated. Penewawa was evaluated at three seeding rates. As in the Western Regional Trial, mean yields were highest in SW and lowest in HR entries (Table 9).

In the 1999 trial, leading SW selections included Pomerelle, WPB BZ 692-108, and IDO 506. Penewawa yield was intermediate and unaffected by seeding rate. Seed treatments were not beneficial for Alpowa. Averaged over 3 years, Penewawa and Pomerelle ranked first and second, respectively, in yield (Table 10). IDO 377S and Winsome were the highest yielding HW selections in 1999. Winsome produced slightly higher yield than IDO 377S over 3 years. Scarlet and WPB 936 produced significantly higher yields than Yecora Rojo in the HR class in 1999. WPB 936 had an average yield advantage of 460 lb/acre over Yecora Rojo over 3 years. Jefferson produced a low yield in 1999 but was equal to WPB 936 over 3 years.

### **Oregon Statewide Spring Wheat Trial (Lower Klamath Lake)**

Low yields and high variability at

the LKL site in 1999 were undoubtedly related to frost events in each month from planting to harvest. The leading SW entries were WPB BZ 692-108 and Alpowa. Pomerelle and Penewawa were significantly lower in yield than both of these selections in 1999 (Table 11). As was observed at KES, seed treatment did not improve yield of Alpowa in 1999 or over 3 years (Table 12). Penewawa was very responsive to increased seeding rates at the organic soil site. The response observed suggests the need to evaluate even higher seeding rates at this site. Three-year results show an average yield advantage of about 300 lb/acre for Alpowa over Penewawa. Wawawai and Whitebird performed poorly at this site.

The highest yielding HW selection in the 1999 trial was ML 455. Yields for Winsome and IDO 377S were 1,000 lb/acre lower. IDO 377S is the only HW entry included over 3 years. WPB 936 was the leading HR entry in 1999 and over years. In 1999, Scarlet also produced much higher yield than Yecora Rojo.

Comparison of performance at the two sites shows a trend for higher test weights and kernal weights and lower protein content at the KES site. Lower test and kernal weights at LKL are probably the result of frost injury. In the 1997 Oregon Statewide Trial, test weights were higher at the organic soil site.

### **Summary**

Promising selections and new varieties are emerging for all spring wheat classes. Data obtained in these trials over several year indicates performance differences between the KES and LKL sites. Factors affecting the site-

specific responses include the very different soil conditions between a low organic matter mineral soil at KES and the high organic matter lakebed soil at LKL. Damage from wheat stem maggot has consistently been more common at the organic soil site and is an important factor in the need for higher seeding rates. More severe frosts also occur at this site. During summer frost events, temperatures are frequently 5 to 7<sup>o</sup>F lower at LKL than at KES. Some grain fields at LKL experienced nearly total losses because of frosts in 1999.

## Research in the Klamath Basin

**Table 1.** OSU Soft White Spring Wheat Nursery: agronomic and grain quality data for spring wheat varieties and lines established May 5 at KES, Klamath Falls, OR, 1999.

Variety / lines	Yield	Test weight	Lodging	Height	50% head
	lb/acre	lb/bu	%	inches	Julian
4950006	6040	63.5	0	28	187
Pomerelle	5820	62.0	0	28	190
Alpowa	5150	63.5	0	30	192
4950027	5010	61.5	0	28	188
Penawawa	4980	62.0	0	31	195
942845	4960	63.0	0	30	193
4850001	4910	61.0	0	31	195
942838	4910	62.5	0	28	190
OR 4970001	4860	60.0	0	30	187
4880013	4800	63.0	0	30	192
OR 9640085	4790	62.0	0	28	190
WA 7831	4780	62.0	0	24	187
Dirkwin	4780	59.0	0	28	191
942889	4740	62.0	0	28	188
Whitebird	4600	64.0	0	26	191
OR 9640078	4520	61.5	0	30	187
OR 9640087	4440	63.0	0	28	187
OR 4970062	4440	62.0	0	28	190
942885	4380	63.5	0	24	187
OR 9640089	4310	62.0	0	26	186
OR 4970063	4180	61.5	0	30	187
OR 4970065	4130	60.5	0	30	189
OR 9640091	4040	63.0	0	26	186
OR 4970039	3910	61.0	0	28	191
Luan (OR 9640080)	3870	60.0	0	24	190
Mean	4690	62.0	0	28	189
LSD (p = 0.05)	720	---	---	---	---
CV (%)	11	---	---	---	---

## 1999 Annual Report

**Table 2.** OSU Soft White Spring Wheat Elite Nursery: 3-year yield summary, 1997-99.

Variety / lines	Yield			2-year average		3-year average	
	1999	1998	1997	yield	rank	yield	rank
	lb/acre	lb/acre	lb/acre	lb/acre		lb/acre	
Dirkwin	4780	4270	4420	4530	7	4490	6
4850001	4910	5490	4880	5200	2	5090	1
4880013	4800	4840	5030	4820	3	4890	2
942838	4910	4140	4660	4530	8	4570	5
942845	4960	4300	4820	4630	5	4690	3
942885	4380	4300	4270	4340	10	4320	7
942889	4740	4490	4630	4620	6	4620	4
OR 9640085	4790	4110		4450	9		
4950027	5010	4540		4780	4		
WA 7831	4780	3770		4280	11		
4950006	6040	5170		5610	1		
Penawawa	4980						
Alpowa	5150						
Pomerelle	5820						
Whitebird	4600						
Luan (OR 9640080)	3870						
OR 9640087	4440						
OR 9640091	4040						
OR 9640078	4520						
OR 9640089	4310						
OR 4970001	4860						
OR 4970039	3910						
OR 4970062	4440						
OR 4970063	4180						
OR 4970065	4130						
Mean	4740	4490	4670	4710		4670	
LSD (p = 0.05)	720	500	NS	NS		NS	
CV (%)	11	8	14	15		17	

## *Research in the Klamath Basin*

**Table 3.** OSU Hard Red Spring Wheat Nursery: agronomic and grain quality data for spring wheat varieties and lines established May 5 at KES, Klamath Falls, OR, 1999.

Variety / lines	Yield	Test weight	Lodging	Height	50% head
	lb/acre	lb/bu	%	inches	Julian
McKay	5090	62.0	0	28	189
4870410	4940	62.0	0	28	188
4920028	4870	62.0	0	28	188
Bugu (9640021)	4570	62.5	0	24	190
4895011	4280	61.0	0	26	186
3900362	4240	60.5	0	22	188
Filin (9640014)	4160	62.0	0	24	190
Klasic	4040	61.5	0	22	182
4970074	4000	60.5	0	30	189
WPB 936	3910	61.0	0	22	183
4880189	3890	60.0	0	26	188
9640008	3890	60.5	0	26	187
Yecora Rojo	3810	60.0	0	16	183
9640026	3700	60.5	0	26	189
4970003	3610	59.5	0	26	188
9640095	3580	60.0	0	28	187
4970054	3580	60.0	0	24	184
4970002	3480	62.0	0	26	189
Mean	4090	61.0	0	25	187
LSD (p = 0.05)	470	---	---	---	---
CV (%)	8	---	---	---	---

## 1999 Annual Report

**Table 4.** OSU Hard Red Spring Wheat Elite Nursery: 3-year yield summary, 1997-99.

Variety / lines	Yield			2-year average		3-year average	
	1999	1998	1997	yield	rank	yield	rank
	lb/acre			lb/acre		lb/acre	
McKay	5090	5080	3850	5090	1	4670	3
Yecora Rojo	3810	3750	4400	3780	11	3990	7
Klasic	4040	3390	4440	3720	12	3960	8
4880189	3890	3990	4360	3940	9	4080	6
4870410	4940	4670	4450	4810	3	4690	2
4895011	4280	3980	4410	4130	7	4220	5
3900362	4240	4720	4240	4480	5	4400	4
4920028	4870	4810	4990	4840	2	4890	1
9640008	3890	4510		4200	6		
Filin (9640014)	4160	3990		4080	8		
Bugu (9640021)	4570	4490		4530	4		
9640026	3700	3940		3820	10		
9640095	3580	3780		3680	13		
WPB 936	3910						
4970002	3480						
4970003	3610						
4970054	3580						
4970074	4000						
Mean	4090	4240	4390	4240		4360	
LSD (p = 0.05)	470	NS	580	570		350	
CV (%)	8	20	9	22		13	

## Research in the Klamath Basin

**Table 5.** OSU Hard White Spring Wheat Nursery: agronomic and grain quality data for spring wheat varieties and lines established May 5 at KES, Klamath Falls, OR, 1999.

Variety / lines	Yield	Test weight	Lodging	Height	50% head
	lb/acre	lb/bu	%	inches	Julian
942834	4870	63.0	0	28	187
942505	4860	62.5	0	26	195
4910006	4670	65.0	0	28	185
9640074	4620	62.0	0	26	187
4940139	4540	62.5	0	28	188
Winsome (4870453)	4530	62.0	0	26	192
4920311	4490	62.5	0	28	190
4970025	4410	63.5	0	28	190
4970081	4330	62.5	0	28	188
4920307	4320	63.0	0	28	191
Sunco (3940124)	4290	63.0	0	24	192
OR 9640081	4230	60.5	0	30	192
4870255	4200	63.5	0	28	184
OR 9640151	4170	62.5	0	28	186
4920292	4160	61.0	0	24	187
4970044	4160	63.0	0	26	189
942866	4030	64.5	0	28	190
4970018	3960	64.0	0	28	187
4930230	3850	61.5	0	30	192
9640143	3840	62.5	0	28	183
942539	3810	61.0	0	28	188
Klasic	3620	62.0	0	20	181
4940141	3520	62.0	0	26	193
4970041	3390	62.0	0	24	189
Mean	4200	62.6	0	27	189
LSD (p = 0.05)	610	---	---	---	---
CV (%)	10	---	---	---	---

## 1999 Annual Report

**Table 6.** OSU Hard White Spring Wheat Elite Nursery: 2-year yield summary, 1997 and 1999.

Variety / lines	Yield				2-year average	
	1999	Rank	1997	Rank	yield	rank
	lb/acre		lb/acre		lb/acre	
Klasic	3620	22	3850	5	3160	7
Winsome (4870453)	4530	6	4270	2	4140	1
4870255	4200	13	4340	1	3690	2
4920292	4160	15	3800	6	3580	4
4920311	4490	7	3170	7	3270	6
4920307	4320	10	4160	3	3680	3
4930230	3850	19	3890	4	3400	5
4910006	4670	3				
942539	3810	21				
4940141	3520	23				
942505	4860	2				
4940139	4540	5				
942834	4870	1				
942866	4030	17				
OR 9640081	4230	12				
OR 9640151	4170	14				
Sunco (3940124)	4290	11				
9640074	4620	4				
9640143	3840	20				
4970018	3960	18				
4970025	4410	8				
4970041	3390	24				
4970044	4160	16				
4970081	4330	9				
Mean	4240		3930		3560	
LSD (p = 0.05)	610		900		540	
CV (%)	10		16		16	

## Research in the Klamath Basin

**Table 7.** Western Regional Spring Wheat Nursery: agronomic and grain quality data for spring wheat varieties and lines established May 5 at KES, Klamath Falls, OR, 1999.

Variety / lines	Yield	Test		Height	50%
		weight	Lodge		head
	lb/acre	lb/bu	%	inches	Julian
<b>Hard Red Varieties</b>					
IDO 544	5080	64.0	0	26	188
Serra	4870	61.5	0	26	187
SDM 50031	4740	64.0	0	24	184
SDM 50032	4490	64.0	0	28	187
UT 3172	4360	62.5	0	33	182
CA 1158	4360	60.5	0	26	186
OR 4920002	4330	62.0	0	24	189
BR 3666	4250	63.5	0	30	185
McKay	4190	62.5	0	26	188
OR 4910028	4150	61.0	0	26	183
CA 1161	4140	59.0	0	24	190
UT 2868	4030	60.5	0	28	184
IDO 528	3990	62.0	0	22	184
BR 3702	3940	62.0	0	24	183
WA 7839	3880	63.5	0	28	186
XKW940W01	3820	62.5	0	31	186
CA 1160	3770	62.0	0	24	190
<b>Mean</b>	4260	62.2	0	26	186
<b>Hard White Varieties</b>					
CA 1162	5070	63.0	0	26	190
OR 4920307	4730	63.0	0	28	191
IDO 531	4570	62.0	0	24	193
IDO 523	4570	62.0	0	24	192
IDO 533	4360	64.5	0	26	188
CA 1107	4150	62.5	0	22	186
CA 1128	4070	62.0	0	26	187
OR 4920292	3890	60.5	0	24	188
Klasic	3820	62.0	0	20	181
<b>Mean</b>	4360	62.4	0	24	188

## 1999 Annual Report

**Table 7 (continued).** Western Regional Spring Wheat Nursery: agronomic and grain quality data for spring wheat varieties and lines established May 5 at KES, Klamath Falls, OR, 1999.

Variety / lines	Yield	Test weight	Lodge	Height	50% head
	lb/acre	lb/bu	%	inches	Julian
<b>Soft White Varieties</b>					
Penawawa	5670	62.5	0	26	190
IDO 526	5220	62.0	0	26	189
IDO 506	5220	62.5	0	26	189
IDO 541	4980	61.5	0	22	189
IDO 525	4800	63.5	0	24	190
IDO 527	4740	59.5	0	24	188
IDO 524	4720	61.5	0	24	190
ML 042-29-3	4680	62.0	0	24	189
OR 942845	4670	63.0	0	26	191
WA 7850	4380	62.0	0	26	189
ML 037A-4-8	4240	60.0	0	24	189
OR 942889	4100	62.0	0	26	188
Federation	3930	58.5	0	37	195
<b>Mean</b>	4720	61.6	0	26	190
Mean	4440	62.0	0	26	188
LSD (p = 0.05)	760	--	--	--	2
CV (%)	10	--	--	--	1

## Research in the Klamath Basin

**Table 8.** Western Regional Spring Wheat Nursery: grain yield of spring wheat varieties and lines established at KES, Klamath Falls, OR, 1997-99.

Variety / lines	Type <sup>1</sup>	Yield			2-year average		3-year average	
		1999	1998	1997	yield	rank	yield	rank
		—————	lb/acre	—————	lb/acre		lb/acre	
McKay	HR	4190	4380	4020	4280	20	4200	10
Federation	SW	3930	3670	3570	3800	29	3720	13
Penawawa	SW	5670	4100	4600	4890	5	4790	3
Klasic	HW	3820	3800	3480	3810	28	3700	14
Serra	HR	4870	4490	4130	4680	11	4500	6
IDO 506	SW	5220	4680	4990	4950	4	4960	1
IDO 523	HW	4570	4650	5280	4610	13	4830	2
IDO 524	SW	4720	4610	4440	4660	12	4590	4
OR 4910028	HR	4150	4930	4240	4540	15	4440	7
OR 4920292	HW	3890	4140	4010	4020	26	4010	12
SDM 50031	HR	4740	4150	4780	4450	17	4560	5
SDM 50032	HR	4490	4100	4070	4290	19	4220	9
UT 2868	HR	4030	4410	3890	4220	21	4110	11
UT 3172	HR	4360	4530	4190	4450	18	4360	8
BR 3666	HR	4250	4050		4150	25		
CA 1107	HW	4150	3820		3980	27		
CA 1128	HW	4070	5340		4700	10		
CA 1158	HR	4360	5560		4960	3		
CA 1160	HR	3770	4660		4220	22		
CA 1161	HR	4140	4190		4160	24		
CA 1162	HW	5070	6160		5610	1		
IDO 525	SW	4800	4620		4710	9		
IDO 526	SW	5220	5220		5220	2		
IDO 527	SW	4740	4780		4760	7		
IDO 528	HR	3990	4440		4210	23		
IDO 533	HW	4360	4840		4600	14		
OR 4920002	HR	4330	4720		4520	16		
OR 942845	SW	4670	4820		4750	8		
WA 7850	SW	4380	5280		4830	6		
XKW940W01	HR	3820						

<sup>1</sup>SW denotes soft white, HW denotes hard white, HR denotes hard red.

## 1999 Annual Report

**Table 8 (continued).** Western Regional Spring Wheat Nursery: grain yield of spring wheat varieties and lines established at KES, Klamath Falls, OR, 1997-99.

Variety / lines	Type <sup>1</sup>	Yield			2-year average		3-year average	
		1999	1998	1997	yield	rank	yield	rank
		—————	lb/acre	—————	lb/acre	lb/acre		
OR 4920307	HW	4730						
OR 942889	SW	4100						
IDO 531	HW	4570						
IDO 541	SW	4980						
IDO 544	HR	5080						
ML 037A-4-8	SW	4240						
ML 042-29-3	SW	4680						
WA 7839	HR	3880						
BR 3702	HR	3940						
Mean		4440	4590	4260	4520		4360	
LSD (p = 0.05)		760	910	930	NS		NS	
CV (%)		10	12	13	40		27	

<sup>1</sup>SW denotes soft white, HW denotes hard white, HR denotes hard red.

## Research in the Klamath Basin

**Table 9.** Oregon Statewide Spring Wheat Trial: agronomic and grain quality data for spring wheat varieties and lines established May 5 at KES, Klamath Falls, OR, 1999.

Variety / lines	Type <sup>1</sup>	Yield	Test	Protein	1,000 Kernal	Lodging	Height	50%
			weight		weight			head
		lb/acre	lb/bu	%	grams	%	inches	Julian
Alpowa (Gaucho)	SW	4560	62.0	10.0	39.8	0	26	192
Alpowa (no Gaucho)	SW	4920	62.2	10.4	41.4	0	28	191
Alpowa (Novartis)	SW	4860	62.4	9.7	43.2	0	29	189
IDO 377S	HW	5160	62.7	10.0	40.8	0	25	183
IDO 506	SW	5400	61.8	9.6	39.1	0	25	189
IDO 523	HW	4800	61.2	10.3	37.5	0	24	192
IDO 525	SW	4560	62.6	9.8	36.5	0	27	193
IDO 526	SW	4920	60.4	9.2	39.1	0	27	189
IDO 533	HW	4680	63.0	9.6	42.0	0	26	186
Jefferson	HR	3900	62.9	10.9	39.3	0	26	184
M 94-4393	Trit	5160	56.0	10.3	52.6	0	36	186
ML 455	HW	4680	62.3	11.2	45.0	0	28	195
Winsome (OR 4870453)	HW	5100	61.5	10.0	38.7	0	26	194
OR 4920307	HW	4380	61.7	10.9	45.5	0	26	192
OR 942845	SW	4320	61.4	10.4	36.7	0	27	189
OR 942889	SW	4740	61.4	10.3	43.9	0	30	188
Penawawa (40 seeds/ft <sup>2</sup> )	SW	4920	60.7	8.8	37.4	0	25	188
Penawawa (20 seeds/ft <sup>2</sup> )	SW	4860	60.8	10.3	37.7	0	26	189
Penawawa (30 seeds/ft <sup>2</sup> )	SW	5040	60.6	10.2	42.8	0	26	187
Pomerelle	SW	5700	61.0	9.5	39.1	0	27	189
Scarlet	HR	5100	62.8	12.7	49.5	0	31	187
Treasure	SW	5340	61.3	9.9	40.6	0	25	189
WA 7850	SW	4860	61.5	9.6	42.6	0	27	188
Wawawai	SW	4980	62.7	10.3	54.0	0	29	187
Whitebird	SW	5100	62.9	9.7	35.7	0	27	189
WPB BZ 692-108	SW	5640	60.6	9.7	42.1	0	28	189
WPB BZ 992-322	HR	4380	61.2	11.5	45.3	0	26	184
WPB 936	HR	4800	61.6	13.5	47.4	0	24	183
Yecora Rojo	HR	4080	60.5	10.8	39.8	0	18	181
CA 1162	HW	4680	61.9	10.0	32.6	0	26	189
Mean		4850	61.5	10.3	41.6	0	27	188
LSD (p = 0.05)		780	0.5	1.0	--	--	--	--
CV (%)		10	1.0	6.0	--	--	--	--

<sup>1</sup>SW denotes soft white, HW denotes hard white, HR denotes hard red, and Trit denotes triticale.

## 1999 Annual Report

**Table 10.** OSU Statewide Spring Wheat Trial: grain yield of spring wheat varieties and lines established at KES, Klamath Falls, OR, 1997-99.

Variety / lines	Type <sup>1</sup>	Yield			2-year average		3-year average	
		1999	1998	1997	yield	rank	yield	rank
		————	lb/acre	————	lb/acre		lb/acre	
Alpowa (Gaucho)	SW	4560	4740	5040	4650	10	4780	7
Alpowa (no Gaucho)	SW	4920	4200	5970	4560	11	5030	5
IDO 377S	HW	5160	5040	4860	5100	4	5020	6
Jefferson	HR	3900	4800	4800	4350	15	4500	10
Penawawa (30 seeds/ft <sup>2</sup> )	SW	5040	5340	7470	5190	3	5950	1
Pomerelle	SW	5700	4980	6120	5340	2	5600	2
Wawawai	SW	4980	4080	4920	4530	12	4660	8
Whitebird	SW	5100	5040	5650	5070	6	5263	3
Winsome	HW	5100	4800	5860	4950	7	5253	4
WPB 936	HR	4800	3900	4850	4350	16	4517	9
Yecora Rojo	HR	4080	3840	4260	3960	17	4060	11
IDO 506	SW	5400	5880		5640	1		
IDO 523	HW	4800	5400		5100	5		
IDO 533	HW	4680	4680		4680	9		
OR 4920307	HW	4380	4620		4500	13		
OR 942845	SW	4320	4500		4410	14		
WA 7850	SW	4860	4560		4710	8		
Alpowa (Novartis)	SW	4860						
CA 1162	HW	4680						
IDO 525	SW	4560						
IDO 526	SW	4920						
M 94-4393	Trit	5160						
ML 455	HW	4680						
OR 942889	SW	4740						
Penawawa (20 seeds/ft <sup>2</sup> )	SW	4860						
Penawawa (40 seeds/ft <sup>2</sup> )	SW	4920						
Scarlet	HR	5100						
Treasure	SW	5340						
WPB BZ 692-108	SW	5640						
WPB BZ 992-322	HR	4380						
Mean		4850	4730	5480	4780		4990	
LSD (p = 0.05)		780	900	620	--		--	
CV (%)		10	12	10	--		--	

<sup>1</sup>SW denotes soft white, HW denotes hard white, HR denotes hard red, and Trit denotes triticale.

## Research in the Klamath Basin

**Table 11.** Oregon Statewide Spring Wheat Trial: Agronomic and grain quality data for spring wheat varieties and lines established May 11 at Klamath County, OR, 1999.

Variety / lines	Type <sup>1</sup>	Yield	Test		1,000 Kernal
			weight	Protein	weight
		lb/acre	lb/bu	%	grams
WPB BZ 692-108	SW	5760	58.5	10.4	41.1
Alpowa (no Gaucho)	SW	5520	59.3	10.7	41.8
Alpowa (Adage)	SW	5340	59.1	10.7	39.3
ML 455	HW	5160	57.7	10.2	37.3
Alpowa (Gaucho)	SW	4860	59.7	10.5	40.9
IDO 523	HW	4740	57.0	10.9	34.5
IDO 533	HW	4680	59.3	11.5	41.0
WPB 936	HR	4680	56.7	14.4	41.9
WPB BZ 992-322	HR	4320	56.3	13.8	45.0
CA 1162	HW	4320	58.1	12.0	34.6
Penawawa (40 seeds/ft <sup>2</sup> )	SW	4260	58.6	10.9	36.7
Scarlet	HR	4260	57.0	13.8	43.4
Treasure	SW	4200	57.3	9.9	33.0
IDO 526	SW	4140	58.8	10.3	35.6
Winsome (OR 4870453)	HW	4020	56.8	10.5	35.4
Pomerelle	SW	3660	57.6	10.2	31.6
WA 7850	SW	3540	57.5	10.4	38.3
Penawawa (30 seeds/ft <sup>2</sup> )	SW	3480	57.0	11.7	38.3
IDO 377S	HW	3420	57.9	12.4	35.2
IDO 525	SW	3300	58.2	10.2	33.0
OR 4920307	HW	3240	55.6	11.2	35.5
Wawawai	SW	3180	56.4	11.4	45.2
Whitebird	SW	3180	58.4	10.8	32.5
Jefferson	HR	3060	58.1	13.9	40.6
IDO 506	SW	2880	58.6	10.5	33.8
Penawawa (20 seeds/ft <sup>2</sup> )	SW	2880	57.7	11.7	36.7
Yecora Rojo	HR	2640	57.5	15.4	41.9
OR 942889	SW	2460	56.5	11.9	34.7
Federation	SW	2340	49.8	---	---
OR 942845	SW	1980	55.2	11.7	32.2
Mean		3840	57.5	11.5	37.6
LSD (p = 0.05)		1680	1.6	0.6	---
CV (%)		27	2	3	---

<sup>1</sup>SW denotes soft white, HW denotes hard white, HR denotes hard red.

## 1999 Annual Report

**Table 12.** OSU Statewide Spring Wheat Trial: 3-year yield summary for organic soil site in Klamath County, OR, 1997-99.

Variety / lines	Type <sup>1</sup>	Yield			2-year average		3-year average	
		1999	1998	1997	yield	rank	yield	rank
		—	lb/acre	—	lb/acre		lb/acre	
Alpowa (GaUCHO)	SW	4860	6840	3690	5850	2	5130	2
Alpowa (no GaUCHO)	SW	5520	6240	3860	5880	1	5210	1
IDO 377S	HW	3420	6300	3580	4860	8	4430	6
Penawawa	SW	3480	7220	3870	5350	6	4860	4
Pomerelle	SW	3660	7190	2890	5430	4	4580	5
Wawawai	SW	3180	5580	2910	4380	10	3890	9
Whitebird	SW	3180	5780	2800	4480	9	3920	8
WPB 936	HR	4680	7010	3620	5850	3	5100	3
Yecora Rojo	HR	2640	6000	3730	4320	11	4120	7
Treasure	SW	4200	6620		5410	5		
Winsome	HW	4020	6100		5060	7		
Alpowa (Adage)	SW	5340						
CA 1162	HW	4320						
Federation	SW	2340						
IDO 506	SW	2880						
IDO 523	HW	4740						
IDO 525	SW	3300						
IDO 526	SW	4140						
IDO 533	HW	4680						
Jefferson	HR	3060						
ML 455	HW	5160						
OR 4920307	HW	3240						
OR 942845	SW	1980						
OR 942889	SW	2460						
Penawawa (20 seeds/ft <sup>2</sup> )	SW	2880						
Penawawa (40 seeds/ft <sup>2</sup> )	SW	4260						
Scarlet	HR	4260						
WA 7850	SW	3540						
WPB BZ 692-108	SW	5760						
WPB BZ 992-322	HR	4320						
Mean		3840	6400	3440	5170		4580	
LSD (p = 0.05)		1680	1003	650	---		---	
CV (%)		27	10	11	---		---	

<sup>1</sup>SW denotes soft white, HW denotes hard white, HR denotes hard red.