

OAT VARIETY SCREENING IN THE KLAMATH BASIN

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Abstract

The Klamath Experiment Station (KES) has participated in the Uniform Northwest Oat Nursery screening program since the 1970s. Commercial varieties in common use locally identified through this program include Cayuse, Border, Appaloosa, and Ajay. The 1999 trial at KES evaluated 16 numbered selections and 15 named varieties. Under cool growing season conditions with frequent spring frosts, yields of oats were higher than yields of either wheat or barley in 1999 KES trials. Three numbered selections from the Idaho breeding program produced the highest grain yields but were not significantly different than any of the named varieties. The selection 95Ab12743 was significantly higher in yield than 12 entries, including 5 named varieties. This selection was ranked eighth out of 26 entries included in the 1998 trial and ranked second behind Ajay over 2 years. High-ranking selections over 3 years from 1997 to 1999 include AbSP 19-9 and 87Ab4983.

Introduction

Oats are grown for both hay and grain in the Klamath Basin. In 1999, oats accounted for over 5,300 acres of 61,000 acres of grain grown within the Klamath Irrigation Project. Oats account for over 10

percent of the 100,000 cereal acres in the region. Oat acreage has increased in the past few years because of concern about stripe rust in spring barley crops. Efforts to identify superior new varieties are coordinated with other research personnel at 10 western region locations.

Procedures

The Uniform Northwest Oat Nursery was planted in a Poe fine sandy loam soil at KES on May 6. Previous crops at the site were annual ryegrass and potatoes. Thirty-one entries were arranged in a randomized complete block experimental design with four replications. Seed was planted at a 1-inch depth with a seeding rate of 100 lb/acre using a Kincaid experimental plot planter. Plots were 5 feet wide and 20 feet long. All plots were fertilized with 20 lb N, 25 lb P₂O₅, and 16 lb S/acre banded at planting; and 80 lb N, 48 lb P₂O₅, and 35 lb S/acre broadcast preplant. 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 stage. Irrigation was applied with solid-set sprinklers arranged in a 40- by 40-foot pattern in accordance with crop needs. Grain was harvested on September 3 with a Hege

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plot harvester with a 5-foot-wide header. Grain yield was recorded for all plots. Test weight was measured in only one replication. Yield data were analyzed statistically using MSUSTAT software. Yield data over multiple years were analyzed using a split-plot design with year as the main plot and entry as the split-plot. Least significant differences (LSD) are based on *student's t* at the 5 percent probability level.

Results and Discussion

In spite of frequent frosts in May and early June, yields and test weights were high (Table 1). The trial average was about 150 bu/acre with mean test weights of 40 lb/bu. These results represent a marked improvement over the 1998 trial, where average yield was 95 bu/acre with test weights averaging 30 lb/bu (Table 2). The 1999 crop was also a slight improvement over 1997 results (Table 3).

A selection from the Aberdeen, Idaho USDA breeding program, 95Ab12743, produced the highest yield at 173 bu/acre. This selection ranked eighth in yield in 1998 and second overall for 2 years. The 1999 yield of 95Ab12743 was not significantly higher than yield of Ajay or Cayuse at the 5-percent probability level, but it was at the 10-percent level. Other numbered selections that produced relatively high yields in 1999 included 91Ab406, 87Ab5632, AbSP 19-9, and 94Ab5543.

Variety performance has been inconsistent over years (Table 4). Ajay ranked 1st in 1998 yield, but 17th and 16th in 1999 and 1997, respectively. Monida produced a high yield in 1997 but was among the lower yielding entries in the

past 2 years. Multi-year data is needed to predict the performance of varieties under Klamath Basin conditions. The 3-year summary suggests AbSP 19-9 and 87Ab4983 may be productive varieties for the Klamath Basin.

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Table 1. Northwestern Uniform Oat Nursery grain yield, test weight, lodging, and plant height of varieties and lines established May 6 at KES, Klamath Falls, OR, 1999.

Variety / lines	Yield	Test	Lodging	Height
		weight		
	lb/acre	lb/bu	%	inches
95Ab12743	5540	39.0	0	33
91Ab406	5210	39.0	0	34
87Ab5632	5180	41.0	1	37
Drummond (KES)	5140	41.0	0	32
AbSP 19-9	5130	41.5	0	38
94Ab5543	5130	40.5	0	37
Whitestone	5120	40.5	0	41
ND 930122	5120	40.0	0	35
Powell	5110	39.5	0	32
Celsia	5110	40.0	0	43
90Ab1322	5070	40.5	0	33
87Ab4983	5060	40.0	0	31
ND 910569	5040	40.0	0	35
86Ab664	5030	39.0	0	37
Cayuse	5010	40.0	0	37
AbSP 9-2	5010	41.0	0	36
Ajay	4990	40.0	0	30
Monida	4970	40.5	6	43
CDC Pacer	4880	42.5	31	43
Rio Grande	4870	40.5	0	36
Croa 35 (KES)	4820	38.5	0	32
Prairie	4790	38.5	0	38
ND 860416	4700	40.5	35	44
84Ab825	4670	40.0	0	34
CDC Boyer	4670	40.0	1	45
91Ab502	4530	40.0	0	32
89Ab4088	4500	41.5	0	35
Otana	4390	40.5	13	44
87Ab5125	4330	40.0	0	32
Derby	4000	40.5	36	46
Kanota (KES)	3080	37.5	48	44
Mean	4840	40.1	6	37
LSD (p = 0.05)	600	--	18	3
CV (%)	8	--	231	6

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Table 2. Northwestern Uniform Oat Nursery grain yield, test weight, lodging, and plant height of varieties and lines established May 1 at KES, Klamath Falls, OR, 1998.

Variety / lines	Yield	Test weight	Lodging	Height
	lb/acre	lb/bu	%	inches
Ajay (82Ab1142)	4340	32.0	0	26
82Ab248	3840	31.0	0	33
90Ab1322	3760	28.0	0	30
87Ab4983	3550	32.5	0	37
91 Ab406	3470	29.0	0	31
87Ab5125	3460	28.5	0	43
84Ab825	3430	30.0	0	33
91Ab502	3340	32.5	10	41
95Ab12743	3320	30.0	25	41
Powell (83Ab3250)	3150	29.5	1	35
Rio Grande (81Ab5792)	3090	29.0	3	33
ND 930122	3090	33.5	0	35
Whitestone (ND 870258)	3060	28.0	10	33
86Ab664	3020	29.0	0	43
IA H61-3-3	2990	32.0	0	39
AbSP 19-9	2870	31.5	13	33
86Ab4582	2830	29.5	15	45
ND 910569	2800	32.0	0	45
89Ab4088	2760	34.0	0	35
Prairie	2750	31.0	0	33
Ogle	2720	27.0	3	37
AbSP 9-2	2680	27.5	25	45
Monida	2660	28.0	20	35
Cayuse	2570	27.5	0	39
ND 860416	2370	32.0	23	43
Celsia	2340	29.0	0	49
CDC Pacer	2270	29.0	15	37
Derby	1970	28.0	10	51
CDC Boyer	1970	27.5	0	43
Otana	1960	29.0	35	47
Mean	2950	29.9	7	38
LSD (p = 0.05)	660	---	NS	---
CV (%)	16	---	278	---

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Table 3. Northwestern Uniform Oat Nursery grain yield, test weight, lodging, plant height, and day of year of 50 percent heading in Julian days (number of days after January 1) of varieties and lines established May 8 at KES, Klamath Falls, OR, 1997.

Variety / lines	Yield	Test wt	Lodging	Height	50% heading
	lb/acre	lb/bu	%	inches	Julian
Celsia	5760	39.0	8	40	195
Ogle	5700	38.0	8	41	189
Monida	5670	37.5	54	42	195
89Ab4088	5640	40.5	18	38	192
89Ab6153	5460	41.0	0	33	189
AbSP9-2	5430	41.5	24	39	193
AbSP 19-9	5350	37.0	30	38	194
87Ab5125	5290	39.5	16	37	195
CDC Boyer	5020	40.0	46	43	193
Prairie	5010	38.0	4	37	191
Whitstone (ND 870258)	4990	41.0	35	39	194
86Ab664	4940	36.5	56	44	195
91Ab502	4820	36.0	35	35	189
Rio Grande (81Ab5792)	4710	38.0	13	38	191
87Ab4983	4630	39.0	4	34	189
Powell (83Ab3250)	4620	35.0	41	39	195
Newdak	4590	39.0	26	37	189
IA H61-3-3	4490	36.0	23	39	194
Cayuse	4440	36.0	48	34	194
Ajay (82Ab1142)	4420	37.0	1	33	195
CDC Pacer	4390	37.0	39	39	192
84Ab825	4320	37.0	23	37	195
Otana	4310	38.5	33	46	195
89Ab1545	4230	39.0	3	38	185
91Ab406	4070	32.0	29	31	194
86Ab4582	3980	38.0	59	35	192
82Ab248	3970	36.5	48	38	195
90Ab1322	3760	35.0	11	31	195
Derby	3540	40.0	18	45	195
ND 860416	3230	39.5	40	37	194
Mean	4690	37.9	26	38	193
LSD (p = 0.05)	NS	-	39	NS	2
CV (%)	24	-	106	17	1

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Table 4. Northwestern Uniform Oat Nursery grain yield of varieties and lines established at KES, Klamath Falls, OR, 1997-99.

Variety / lines	Yield			2-year average		3-year average	
	1999	1998	1997	yield	rank	yield	rank
		lb/acre		lb/acre		lb/acre	
Cayuse	5010	2570	4440	3790	18	4010	18
Otana	4390	1960	4310	3180	25	3550	21
Monida	4970	2660	5670	3820	17	4430	3
Rio Grande	4870	3090	4710	3980	12	4220	14
Ajay	4990	4340	4422	4670	1	4580	1
Powell	5110	3150	4620	4130	6	4290	11
86Ab664	5030	3020	4940	4030	10	4330	9
ND 860416	4700	2370	3230	3540	23	3430	22
87Ab5125	4330	3460	5290	3900	15	4360	8
84Ab825	4670	3428	4320	4050	9	4140	17
Derby	4000	1970	3540	2990	26	3170	23
89Ab4983	5060	3550	4630	4310	5	4410	4
Whitestone	5120	3060	4990	4090	8	4390	6
90Ab1322	5070	3760	3760	4420	3	4200	15
Celsia	5110	2340	5760	3730	20	4400	5
Prairie	4790	2750	5010	3770	19	4180	16
89Ab4088	4500	2760	5640	3630	21	4300	10
91Ab502	4530	3340	4820	3940	13	4230	13
AbSP9-2	5010	2680	5430	3850	16	4370	7
AbSP19-9	5130	2870	5350	4000	11	4450	2
91Ab406	5210	3470	4070	4340	4	4250	12
CDC Boyer	4670	1970	5020	3320	24	3890	19
CDC Pacer	4880	2270	4390	3580	22	3850	20
95Ab12743	5540	3320		4430	2		
ND 910569	5040	2800		3920	14		
ND 930122	5120	3090		4110	7		
87Ab5632	5180						
94Ab5543	5130						
Drummond	5140						
Croa 35	4820						
Kanota	3080						
Mean	4850	2930	4710	3900		4150	
LSD (p = 0.05)	590	660	NS	510		620	
CV (%)	8	16	24	29		41	