SMALL GRAIN VARIETY TRIALS

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Introduction

The purpose of these trials was to evaluate the performance of small grain cultivars that were in development, newly released, or commercially available. Plant breeders gain site-specific performance information for advanced lines and new releases. The local adaptation of new varieties in comparison to standard varieties can help growers decide which variety to plant. Four small grain variety trials were conducted at Malheur Experiment Station in the 1997-1998 crop year, as a location of the OSU statewide variety testing program. The trials included winter and spring barley trials and winter and spring wheat trials.

Methods

All winter and spring variety trials were planted in a randomized complete block design with three replications. Each plot was planted on a 60-in bed with seven rows spaced 6 in apart on the bed. Plot length was 20 ft, with 3.5 ft alleys cut between tiers of plots before harvest. Winter grain trials followed sweet corn; the stubble was flailed, and the field was disked, then 100 lb/acre P_2O_5 and 20 lb/acre N were applied. The field was deep ripped, plowed, and groundhogged to prepare the seedbed. The field was marked out into 60-in beds and staked for plots. Winter grain trials were planted October 17, at a rate of 30 seeds/ft^2 for the winter barleys, and 120 lb/acre for the winter wheats. The field was recorrugated on 30-in rows immediately after planting, then furrow-irrigated to promote rapid and even germination and emergence. Soil sampling February 10, 1998, showed 127.5 lb N/ac in the top 2 ft of soil.

The spring barley and spring wheat trials were planted March 20, 1998, in the same field beside the winter trials, on 5-ft by 20-ft plots, replicated three times. Seeding rate was 30 seeds/ft^2 for spring barleys and spring wheats.

All trials were furrow-irrigated. Nitrogen fertilizer was applied May 5 at 47 lb N/acre in the form of urea prills. Bronate herbicide was applied June 9 at 1.5 pt/acre. The winter cereal plots were harvested July 21, and the spring plots were harvested July 22; the grain from each plot was bagged and tagged. The grain samples were analyzed at the OSU Cereals Laboratory, Corvallis, and the results were tabulated and posted at www.css.orst.edu/cereals.

Results

The grain variety trials at Malheur Experiment Station were badly damaged by severe hail on July 4, 1998.

Winter barley dates of 50 percent heading, plant height at maturity, lodging, and visually estimates of hail loss are recorded in Table 1. The winter barley trial was harvested but the yields were so low and variable due to hail damage as to be meaningless.

The OSU spring barley trial (Table 2) included seven feed-barleys, three malting barleys, three dual-use barleys, and three experimental varieties of unspecified market class. Yields ranged from 4,081 lb/acre for UC958 to 1,559 lb/acre for BCD 22. Test weights ranged from 51.8 lb/bu for Baronnesse to 43.8 lb/bu for UC958. Protein content ranged from 10.8 percent for 78AB10274 and Chinook to 8.8 percent for Galena. Tango and UC958 were the earliest spring barleys, with 50 percent heading observed at May 31, while Idagold was the latest, with 50 percent heading two weeks later on June 15. Lodging was severe in this trial because of the July 4 hail, wind and rain, averaging 60 percent. Lodging ranged from 35 percent for UC958 to 93 percent for Steptoe, with great variability among plots. BCD22 had high visually estimated hail loss and was among the barleys with the lowest yield in this trial.

The OSU Statewide Winter wheat trial (Table 3) included 18 soft white varieties, 5 club wheats, 2 hard red wheats and 1 hard white winter wheat. Yields were reduced by hail damage at this location, ranging from 102 bu/acre for Rod to 42 bu/acre for Foote. Test weight ranged from 62.9 lb/bu for Hybritech 1019 to 52.6 lb/bu for Hiller. Protein content ranged from 11.6 percent for SDM 215-2 to 9 percent for OR939515. Thousand kernel weight ranged from 50.1 g/k for Lambert to 23.8 g/k for ID86-10420A. Heading dates ranged from May 12 for Foote to May 30 for Rod, Coda, Madsen, and Eltan. Plant height ranged from 47-in tall ID86-10420A down to 36-in tall Brundage. Only Eltan lodged in this trial.

The OSU Statewide Spring wheat trial included 13 soft white types, 7 hard white wheats, and 6 hard red spring wheats (Table 4). Yields following hail damage ranged from 73 bu/acre for WA7850 to 34 bu/acre for Yecora Rojo. Test weight of the spring wheat varieties ranged from 63 lb/bu for Yecora Rojo to 46.9 lb/bu for Pomerelle. Protein content ranged from 12.1 percent for WPB 936 to 9.3 percent for WA7850, Promise, and SDM50-30. Thousand kernel weight ranged from 42 g/k for WPB BZ 987-331 to 27.7 g/k for IDO377S and Pomerelle. Date of 50 percent heading ranged from May 30 for Yecora Rojo to June 12 for WA7850, ML 107-455, Whitebird, Wawawai, IDO533, Alpowa, OR4870453, Pomerelle, and OR4920307. Plant height ranged from 47 in for Wawawai to 32 in for Yecora Rojo. Lodging was observed in WA7850 and IDO377S, while Yecora Rojo suffered the most hail damage of the spring wheat varieties in this trial.

Table 1. Heading date, plant height, lodging, hail damage, and uncleaned yield for winter barleys, Malheur Experiment Station, Oregon State University, Ontario, OR, 1998.

Variety	Market class	50 percent heading	Plant height	7/13 lodging	Visual estimate of hail loss	Uncleaned yield
		doy	in	%	%	lb/acre
Kold	6RF	132	41	13	50	2,990
Scio	6RF	134	39	0	73	2,391
Steptoe	6RF	124	49	3	90	900
ORW10	6RF/M	123	39	0	90	731
ORW11	6RF	135	42	10	87	1,889
Strider	6RF	134	38	0	67	3,878
OR1957369	6RF	134	37	0	87	1,690
Pride	6RF	144	39	27	67	3,278
Sprinter	6RF	142	39	0	67	2,073
Average		134	40	6	75	2,202
LSD 0.05		3	3.7	NS†	11	NS

† NS: not significant.

Table 2. Yield, test weight, protein percentage, thousand kernel weight, heading date, plant height, lodging, and hail damage for spring barleys, Malheur Experiment Station, Oregon State University, Ontario, OR, 1998.

Variety	Market class	Yield	Test weight	Protein	1000 kernel	Heading date	Height	Lodging	Hail damage
		lb/acre	lb/bu	%	(g)	DOY	(in.)	%	%
UC958	2RF	4,081	43.8	9.6	37.0	151	35	57	20
BZ 594-19	2RF	3,829	50.1	9.6	36.5	163	48	67	30
C-32	2RM	3,759	47.2	9.6	31.6	163	38	50	13
Orca	2RF/M	3,526	53.5	10.4	45.9	152	49	67	30
Baronesse	2RF	3,278	51.8	9.1	32.1	163	45	60	37
BCD 47	2RF/M	3,189	45.5	10.7	34.0	163	37	73	33
Galena	2RM	3,100	47.9	8.8	35.2	164	42	37	37
BCD 12	2RF/M	3,023	48.1	9.1	34.9	162	36	10	37
MT920073		2,636	50.5	10.5	35.0	160	48	60	47
H3860224		2,606	50	10.7	34.0	163	47	87	43
Tango	6RF	2,545	46.7	9.3	33.8	151	48	73	33
Idagold	2RF	2,531	44.9	10.2	27.9	166	40	70	33
78AB10274	2RM	2,522	49.4	10.8	38.4	163	50	77	60
Sprinter	6RF	1,986	43.9	9.3	25.3	162	45	40	27
Gallatin	2RF	1,906	49.3	10.4	32.8	160	50	67	17
Steptoe	6RF	1,765	44.1	9.1	32.4	157	--	93	30
Chinook	2RM	1,717	50	10.8	37.8	157	50	80	40
BCD 22	2RF/M	1,559	50.9	9.6	32.4	164	36	13	70
Mean		2,753	48.2	9.8	34.3	160	44	60	35
LSD (0.05)		1,172	4.5	NS†		4	4	NS	NS
LSD (0.10)		975	3.7	1.2					
CV		26	6	9.0					
P-value		0	0	0.1					

† NS: not significant.

Table 3. Yield, test weight, protein percentage, thousand kernel weight, heading date, plant height, lodging, and hail damage for winter wheats. Malheur Experiment Station, Oregon State University, Ontario, OR, 1998.

Variety	Market class	Yield	Test weight	Protein	1000 kernel	Heading date	Height	Lodging	Hail damage
		bu/acre	lb/bu	%	g	doy	in.	%	%
Rod	SW	102	57.3	10.1	37.6	150	40	0	0
WA7752 (Coda)	Club	98	62	9.8	36.9	150	42	0	0
Rohde	Club	85	58	10.2	30.1	144	37	0	0
ORCL0054 (Temple)	Club	84	59	10.6	37	137	43	0	0
Rely	Club	84	60.2	9.7	36.4	150	39	0	3
Hybritech 1019	SW	82	62.9	10.6	45.5	136	41	0	23
Stephens-Raxil	SW	82	59.2	10.8	46	142	40	0	23
SDM 215-2	HR	78	63.3	11.6	40.1	140	38	0	10
Madsen	SW	76	59.2	10.2	40.3	150	39	0	3
Hiller	Club	76	52.6	10.5	28.8	148	38	0	10
ID86-10420A	SW	75	60.4	9.7	23.8	149	47	0	17
Madsen+Stephens	SW	75	59.4	10.1	42.5	144	39	0	13
Stephens-Vitavax+ Gaucho	SW	73	59.4	10.7	41.3	141	37	0	17
OR898120 (Weatherford)	SW	73	60.5	10	38.6	147	42	0	10
Stephens-Dividend	SW	73	60.3	9.8	47.3	142	40	0	13
Eltan	SW	68	58.5	9.7	38.8	150	41	27	13
ID467	HR	67	61.3	10.8	42.2	147	40	0	17
Gene	SW	67	59.3	10.9	41.3	137	37	0	17
Hybritech 1017	SW	67	59.5	9.5	43.7	142	43	0	17
OR939515	SW	65	61.5	9	44.3	142	41	0	10
Lambert	SW	64	60.5	10	50.1	142	41	0	27
Stephens -Vitavax, no Gaucho	SW	63	60.2	9.9	48.3	139	39	0	17
MacVicar	SW	60	58.6	9.9	42.8	144	41	0	33
OR850513 (Ivory)	HW	59	60.4	10.9	41.3	134	42	0	17
ID14502B (Brundage)	SW	57	62.2	9.8	40.3	132	36	0	20
OR880172 (Foote)	SW	42	59.2	10.9	42.6	142	43	0	40
Mean		73	59.8	10.2	40.3	143	40	1	14
LSD (0.05)		19	2.7	1		4	4	NS†	10
LSD (0.10)		16	2.2	0.9					
P-value		0	0	0.01					
CV		16	3	6					

† NS: not significant.

Table 4. Yield, test weight, protein percentage, thousand kernel weight, heading date, plant height, lodging, and hail damage for spring wheats. Malheur Experiment Station, Oregon State University, Ontario, OR, 1998.

Variety	Market class	Yield	Test weight	Protein	1000 kernel	Heading date	Height	Lodging	Hail damage
		bu/acre	lb/bu	%	g	doy	in	--------%	--------
WA7850	SW	73	58.1	9.3	35.5	163	39	37	3
IDO506	SW	71	57.5	9.9	30.6	161	43	3	10
WPB BZ 987-331	HR	69	60.6	11.3	42	152	42	0	23
IDO377S	HW	69	58.2	11.4	27.7	162	43	33	0
IDO505	SW	66	59.3	9.8	34.4	162	42	3	7
WPB BZ 992-108	SW	63	59.1	9.7	36.6	162	42	3	10
Jefferson	HR	63	60.8	12	34.5	155	40	7	7
Promise	SW	63	58.1	9.3	27.8	162	41	0	17
ML107-455	HW	61	58.1	10.7	35.8	163	39	10	13
Whitebird (ID392)	SW	61	58.7	9.8	30.3	163	42	0	13
WA7802	HR	59	59.7	12	34.6	159	44	3	0
IDO523	HW	58	57.4	11	27.8	161	38	0	23
SDM50-30	SW	58	58.8	9.3	28.9	162	40	3	13
OR3900362	HR	57	59.1	11.6	31.3	161	40	0	17
Penawawa	SW	57	60	10.3	32.5	161	40	0	20
Alpowa (no Gaucho)	SW	56	58.2	9.9	31.7	162	43	0	20
Wawawai	SW	55	58.5	9.9	35.3	163	47	13	7
WPB 936	HR	54	59.6	12.1	36.9	153	37	0	0
IDO533	HW	54	58.6	10.7	27.9	163	39	0	17
OR4870255	HW	54	62.6	11.2	35.9	151	41	0	10
Alpowa	SW	53	58.5	10	32.1	163	43	0	17
OR4870453	HW	52	57.6	11	28.3	163	38	0	20
Pomerelle	SW	48	46.9	10.2	27.7	163	34	0	10
OR942845	SW	47	59.1	10	31.4	162	41	0	17
OR4920307	HW	42	58.7	11.5	32.6	163	40	0	17
Yecora Rojo	HR	34	63	12	40.9	150	32	0	40
Mean		57	58.6	10.6	32.7	160	40	4	13
LSD (0.05)		12	1.8	0.8		2	2	19	11
LSD (0.10)		10	1.5	0.6					
CV		13	2	4					
P-value		0	0	0					