

**SMALL GRAIN VARIETY COMPARISONS
AT THE MARICOPA AGRICULTURAL CENTER**

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Summary

Durum wheat, bread wheat and barley varieties and experimentals were evaluated for the first time at the Maricopa Agricultural Center under adverse conditions. Soil and growth variation was considerable and optimal yield and quality was not always obtained. Much was learned that can be applied to management of future yield evaluations at the Center. Relative performance of presently grown varieties are revealed in the data presented, Tables 1 through 5.

Yield evaluation trials with small grains were moved from the Mesa Agricultural Center to the Maricopa Agricultural Center for the 1984 harvest. Much greater variation in soil conditions was anticipated and for the most part we changed the experimental plot designs from randomized blocks of 16 more entries with four replications to Latin squares of six entries and six replications to account better for the variability statistically. The same check variety was included in all Latin squares of a particular grain class or study to compare varieties between Latin squares.

The planting site was recently laser leveled, fallow after cotton and covered with flood water prior to seeding. Fifty-nine durum wheat varieties and experimentals were compared in seven Latin squares and one randomized block with Aldura as the check variety (Table 1 and 2). Sixty-nine bread wheat varieties and experimentals were compared in nine Latin squares and one randomized block, utilizing Westbred 911 as the check variety (Tables 3 and 4). Eleven barley varieties were compared in two Latin squares with Gustoe as the check variety (Table 5). The varieties chosen for the checks have given the most optimal and consistent performance at the Mesa Agricultural Center among the current prevalent commercial varieties.

Seeding was in a moist soil after a preplant irrigation. The Latin squares were seeded November 15-16, and the randomized blocks, November 25, 1983. Seeding rates were 75 pounds per acre for the bread wheats and 80 pounds for the durum wheat and barley. Fertilizer was applied during seedbed preparation at the rate of 90 pounds N and 65 pounds P_2O_5 . An additional 55 pounds N were applied at each of the first and second postplant irrigations.

Each plot consisted of six 1-foot rows, 12 feet long. The center four rows of each plot were harvested with a "Hege" combine. Using the same factor to account for end border effect that we have used at Mesa for several years, yields reported are calculated at 8 percent less than actual weights.

Abnormal leaf yellowing and dying back were evident about 60 days after emergence and persisted for several weeks. The cause of this condition was not identified. This condition was prevalent among the early planted bread wheat Latin squares. The durum wheat and the later planting (randomized blocks) were only minimally affected.

Table 1. Durum wheat varieties and experimentals compared in 6 x 6 Latin squares.

	Maturity Date	Lodging %	Plant height in	Hard vitreous %	Seed weight gm/m	Test weight lbs/bu	Grain Yield lbs/A	1/	% of Aldura
Latin Square 29 (CV=6.0%)									
Aldura	5-14	0	31.5	95.3	50.7	64.0	7364	a	100
Waha "S"	5-9	0	35.9	84.7	50.3	64.2	7348	a	100
P881-738	5-20	0	33.1	89.8	46.8	61.7	6858	b	93
P881-660	5-20	0	36.6	96.0	48.6	64.5	6855	b	93
Westbred 881	5-11	0	33.1	96.4	54.8	62.7	6083	c	82
83-62-266	5-19	0	36.2	97.9	51.2	62.5	5788	c	79
Latin Square 30 (CV=3.4%)									
Shaw"S"-Mex 75 x YAV"S"	5-11	0	35.9	87.9	48.4	65.0	7650	a	102
Aldura	5-13	0	31.1	93.2	50.8	64.0	7498	ab	100
W-59	5-15	0	32.7	94.8	47.9	64.7	7359	ab	98
(S0129--JNK)YAV "S"	5-18	0	33.5	97.7	45.8	66.2	7296	b	97
W-66	5-16	0	35.1	84.9	49.2	64.7	7218	bc	96
Shaw"S" x YAV "S"	5-17	0	37.0	95.3	52.2	64.7	6932	c	92
Latin Square 31 (CV=6.9%)									
Aldura	5-14	0	31.3	91.0	48.7	63.7	7588	a	100
E28-1	5-16	2	36.6	76.2	52.3	65.0	7508	a	99
E26-3	5-14	0	35.9	69.4	53.0	64.7	7451	a	98
W-30	5-12	0	31.9	94.1	54.0	65.0	7245	a	95
E5-1	5-12	27	31.9	79.6	48.7	65.0	7013	a	92
Rokel "S" (15)	5-15	0	36.2	92.5	50.2	63.5	6956	a	92
Latin Square 32 (CV=4.0%)									
Bittern "S"	5-12	1	35.1	87.1	53.6	66.0	7407	a	104
Aldura	5-14	0	31.5	94.8	49.2	64.0	7148	b	100
Mexi "S" x Fg "S"	5-12	0	35.1	87.2	53.3	63.0	6754	c	94
Yavaros 79	5-15	2	34.7	87.5	48.7	64.0	6736	c	94
Memo "S"-Goo "S"	5-18	0	39.6	95.7	54.3	65.0	6521	cd	91
WDE-80-10	5-9	2	33.5	89.2	50.5	62.0	6261	d	88
Latin Square 33 (CV=3.9%)									
W-2	5-11	2	33.5	87.1	56.3	63.7	7005	a	104
Aldura	5-13	0	31.1	90.5	47.9	63.7	6755	ab	100
W-50	5-16	0	32.5	87.0	47.2	64.0	6560	b	97
W-1	5-13	1	33.7	89.6	53.5	64.7	6327	bc	94
W-60	5-16	0	32.7	95.6	50.0	64.5	6040	cd	89
W-52	5-15	0	33.3	96.2	47.2	62.7	6004	d	89
Latin Square 27 (CV=6.5%)									
Aldura	5-15	0	29.6	92.1	48.5	63.2	6319	a	100
W-4	5-15	0	29.9	92.9	55.0	63.2	6082	ab	96
W-6	5-16	0	30.3	95.2	50.7	63.7	5953	ab	94
W-18	5-15	0	31.9	86.7	52.0	63.2	5773	b	91
W-13	5-9	14	33.1	82.2	48.0	62.5	5652	b	89
Mexicali 75	5-7	5	33.9	81.5	56.2	68.5	5594	b	89
Latin Square 28 (CV=5.6%)									
Aldura	5-14	0	29.9	91.1	49.7	63.2	6453	a	100
W-46	5-10	1	32.7	88.7	52.1	64.7	6283	ab	97
W-34	5-11	0	32.7	87.3	60.7	63.5	5930	bc	92
W-5	5-13	0	32.3	87.0	51.2	63.5	5919	bc	92
D-37	5-10	1	33.9	92.0	50.8	62.2	5914	bc	92
83-62-279	5-15	2	37.2	91.2	56.2	62.0	5503	c	85

1/ Within each Latin square, yields followed by the same letter are not significantly different at the 5% level of probability using Duncan's Multiple Range.

Table 2. Durum quality selections compared in randomized block with four replications.

	Maturity Date	Lodging %	Plant height in	Hard vitreous %	Seed weight gm/m	Test weight lbs/bu	Grain yield lbs/A	1/
W-30	5-15	2	32.6	96.5	47.4	64.0	6608	a
Rogue 289	5-14	11	33.2	93.2	48.7	64.0	6447	ab
W-46(222)	5-14	15	32.5	94.2	48.7	64.5	6405	abc
W-266	5-14	6	34.5	98.3	44.9	62.0	6354	abcd
Aldura	5-14	0	28.3	99.6	45.0	63.5	6304	bcde
Rogue 225	5-12	2	34.0	89.4	50.3	64.0	6205	bcdef
W-315	5-14	16	31.8	99.6	54.2	65.0	6132	cdef
Cando	5-17	2	36.8	98.5	38.4	61.5	6125	cdef
D893 NK	5-14	8	31.4	95.4	43.1	65.0	6108	defg
W-269	5-14	2	34.8	99.0	43.7	62.0	6094	defg
D-46	5-8	9	33.7	99.5	53.3	63.5	6072	defg
D-28	5-13	0	34.0	90.3	54.3	62.0	6045	efgh
W-24	5-20	25	35.6	99.6	41.3	63.0	6010	efgh
W-47(223)	5-18	0	28.0	97.3	45.6	61.5	5958	efgh
W-234	5-19	8	37.4	99.0	41.9	62.0	5946	fgh
Waid	5-20	6	37.2	100.0	37.8	60.5	5813	ghi
W-21	5-10	15	35.3	100.0	38.4	63.0	5751	hij
W-25	5-16	28	36.2	99.6	40.7	63.5	5653	ij
W-244	5-13	9	34.4	98.4	47.8	64.5	5487	jk
W-48(224)	5-16	3	31.9	99.9	44.5	62.0	5472	jk
W-35-1	5-18	5	32.3	98.5	48.7	62.5	5355	k
W-205	5-19	13	33.7	99.2	42.3	61.5	5332	k
W-23(278)	5-17	1	35.3	99.2	41.3	63.5	5053	l
83-39-124	5-8	38	36.8	99.5	53.3	62.5	4921	l

1/ Yields followed by the same letter are not significantly different at the 5% level of probability using Duncan's Multiple Range.

Table 3. Bread wheat varieties and experimentals compared in 6 x 6 Latin squares.

	Maturity Date	Lodging %	Plant height in	Yellow berry %	Seed weight gm/m 2/	Test weight lbs/bu 2/	Grain Yield lbs/A 1/	% of check
<u>Latin Square 19 (CV=10.6%)</u>								
X-4236	5-11	0	30.0	16.3	35.7	61.2	6095	a 114
C79-97	5-12	0	33.6	6.4	36.4	61.7	5965	ab 112
Yecora Rojo	5-7	0	29.9	2.1	38.9	62.0	5473	ab 102
Westbred 911	5-19	0	30.1	4.6	39.4	61.0	5341	ab 100
Probrand 771	5-8	0	32.4	4.5	38.8	60.0	5333	ab 100
X-3940	5-14	0	37.5	15.0	28.4	61.7	5235	b 98
<u>Latin Square 20 (CV=9.9%)</u>								
Yecora Rojo	5-8	0	31.0	7.1	43.9	63.0	5918	a 111
WRP-9-15	5-18	0	31.0	11.6	37.0	60.0	5887	a 110
7023	5-12	0	31.2	8.8	35.7	59.5	5855	a 109
P 981-232	5-11	0	31.0	24.5	36.0	61.0	5758	a 108
Glennson	5-11	0	38.0	6.6	37.0	61.7	5498	a 103
Westbred 911	5-19	0	30.1	6.1	35.4	61.0	5350	a 100

Table 3. Bread wheat varieties and experimentals compared in 6 x 6 Latin squares. (cont'd)

	Maturity Date	Lodging %	Plant height in	Yellow berry %	Seed weight gm/m ² /	Test weight lbs/bu ² /	Grain Yield lbs/A	1/	% of check
<u>Latin Square 21 (CV=9.0%)</u>									
Probred	5-9	0	33.6	3.6	45.0	61.7	6126 a		112
C79-268-1	5-11	0	31.2	.7	37.2	58.5	5636 ab		103
Hermosillo	5-9	4	34.6	3.8	40.1	61.7	5481 b		100
I-45	5-12	0	36.7	10.9	34.5	61.7	5478 b		100
Westbred 911	5-18	0	29.4	4.2	38.0	61.0	5460 b		100
C79-253	5-13	0	29.9	1.9	34.7	58.5	5267 b		96
<u>Latin Square 22 (CV=8.5%)</u>									
C79-162-1	5-9	0	39.4	2.9	37.1	62.5	5124 a		103
E106-19	5-9	0	29.6	8.4	44.7	63.5	5056 a		102
Oslo	5-11	0	37.4	8.5	38.7	62.5	4971 a		100
Westbred 911	5-18	0	29.2	3.6	40.8	61.0	4967 a		100
E117-23(Soft red)	5-8	0	29.2	-	41.3	60.7	4861 a		98
E105-9(Soft red mixed)	5-6	0	29.6	-	43.0	62.0	4748 a		96
<u>Latin Square 23 (CV=8.2%)</u>									
Cajeme 71	5-8	0	30.3	4.4	45.5	62.5	5141 a		107
Genaro	5-9	0	34.3	3.9	38.0	62.7	4987 a		103
K45002xBJY "S"	5-8	0	35.1	5.6	43.9	62.0	4939 a		102
BJY "S" x JUP83	5-9	0	36.2	4.1	37.0	60.7	4926 a		102
Westbred 911	5-17	0	27.2	4.4	40.4	61.2	4822 a		100
YR x PAM "S"	5-8	0	32.3	6.1	41.9	62.5	4777 a		99
<u>Latin Square 24 (CV=5.5%) Hard white wheats</u>									
Klasic	5-8	0	31.1	-	46.9	63.5	6641 a		113
Nacozeni 76	5-12	0	36.6	-	38.9	61.7	6471 ab		110
Yecorato 77	5-7	0	29.2	-	43.7	61.5	6201 bc		106
SGW-012	5-8	0	29.9	-	42.0	61.7	6117 bc		104
Westbred 911	5-19	0	28.8	1.1	41.5	61.0	5871 c		100
Pavon 76	5-10	0	36.2	-	36.9	61.7	5870 c		100
<u>Latin Square 25 (CV=8.2%)</u>									
C79-281	5-10	0	36.6	5.5	35.8	60.7	6188 a		101
LIP-4	5-12	0	35.1	7.0	37.2	62.0	6187 a		101
Westbred 911	5-19	0	28.8	1.4	38.2	61.2	6155 a		100
LIP-31	5-14	0	39.8	.7	41.9	61.2	6126 a		100
LIP-21	5-8	13	40.2	13.6	38.1	62.7	5966 a		97
906-R	5-8	7	36.6	.6	41.3	61.2	5658 a		92
<u>Latin Square 26 (CV=7.1%) Hard white wheats</u>									
P982-163	5-10	0	31.1	-	39.8	61.0	6576 a		112
MAYA-NAC	5-9	0	37.2	-	37.6	63.0	6441 a		110
P982-152	5-13	0	26.8	-	40.7	59.5	6129 ab		104
Westbred 911	5-18	0	27.6	-	40.2	61.0	5871 b		100
LIP-32	5-9	8	37.4	-	49.8	61.3	4297 c		73
I-10	5-9	33	42.6	-	52.2	62.5	3890 c		66
<u>Latin Square 34 (CV=4.2%)</u>									
Ures	5-10	0	33.9	4.0	38.1	62.5	6261 a		109
Westbred 911	5-18	0	27.2	2.6	43.2	61.2	5767 b		100
BJY-JUP	5-11	0	33.9	3.2	35.8	63.0	5368 c		93
83-46-365	5-13	0	34.3	2.4	39.5	61.5	5241 c		91
I-47	5-9	1	39.8	3.9	46.0	59.0	5093 c		88
SGW-045	5-8	2	34.3	2.9	35.0	60.5	4370 d		76

1/ Within each Latin square, yields followed by the same letter are not significantly different at the 5% level of probability using Duncan's Multiple Range.

2/ Seed and test weights include shriveled and immature seed which was present in all bread wheat varieties.

Table 4. Hard red wheat quality selections compared in randomized block with four replications.

	Maturity Date	Lodging %	Plant height in	Yellow berry %	Seed weight gm/m	Test weight lbs/bu	Grain yield lbs/A	1/
IS8322	5-12	2	35.7	8.2	40.1	62.0	6350	a
I-5(215)	5-14	1	37.0	2.2	43.1	62.0	6317	ab
Yecora Rojo	5-7	0	29.3	3.8	43.8	63.0	6316	ab
I-26	5-11	7	34.7	3.5	40.5	61.5	6112	bc
I-70	5-8	20	35.1	7.5	44.7	62.0	6093	c
I-43(229)	5-11	0	36.5	1.6	38.9	61.5	5994	cd
I-45(226)	5-16	0	34.1	3.8	39.1	62.5	5806	de
LIP-20	5-12	2	36.0	3.5	40.2	61.0	5804	de
Westbred 911	5-18	0	26.8	1.5	40.4	61.0	5729	ef
LIP-4	5-10	0	36.0	14.4	41.4	61.0	5660	efg
I-56	5-12	5	35.3	3.4	40.5	61.5	5536	fgh
I-65(234)	5-13	0	36.0	4.4	41.4	60.5	5518	fgh
I-54	5-12	0	36.0	.0	31.4	60.0	5500	gh
I-36(223)	5-12	0	35.8	.7	40.4	59.0	5470	ghi
83-46-353	5-8	11	37.7	.8	38.9	61.0	5461	ghi
68-320(LIP)	5-17	0	33.3	1.5	40.3	62.0	5390	hij
I-47(227)	5-13	4	39.3	3.6	39.7	59.0	5325	hij
IS8314	5-11	4	34.7	4.2	44.4	61.0	5227	ij
I-73	5-9	6	32.4	1.5	45.0	61.5	5202	jk
I-85	5-7	0	33.4	.7	36.3	61.5	5191	jk
I-97	5-10	6	37.2	2.5	38.9	62.5	5026	k
I-49	5-16	1	36.7	.0	37.6	61.5	4705	l
I-95(242)	5-15	8	47.1	2.3	33.9	61.0	4140	m
I-94(241)	5-15	40	30.9	2.4	35.1	63.5	4013	m

1/ Yields followed by the same letter are not significantly different at the 5% level of probability using Duncan's Multiple Range.

Table 5. Barley varieties compared in 6 x 6 Latin squares

	Maturity Date	Lodging %	Plant height in.	Test weight lbs/bu	Grain Yield lbs/A	1/	% of Gustoe
<u>Latin Square 35 (CV=3.8%)</u>							
Sunbar 409	5-11	0	35.1	49.2	7330	a	101
Gustoe	5-8	0	29.9	53.0	7232	a	100
BFP-78-40C	5-7	12	31.5	50.7	7068	ab	98
BB82-2	5-10	0	36.0	49.5	6918	b	96
A76-15-1	5-6	4	30.3	51.2	6885	b	95
Columbia	5-10	0	34.3	51.2	6877	b	95
<u>Latin Square 36 (CV=5.6%)</u>							
Gustoe	5-8	0	28.2	53.0	7000	a	100
BFP-79-18	5-7	0	29.9	54.0	6348	b	91
Gus	5-4	7	29.4	53.5	6259	b	89
Prato	5-6	24	35.1	49.7	6204	b	89
Westbred 501	5-6	3	28.6	53.7	5958	b	85
X1558	5-10	4	29.2	50.5	5947	b	85

1/ Within each Latin square yields followed by the same letter are not significantly different at the 5% level of probability using Duncan's Multiple Range.