

Durum Wheat Variety Trials on the Safford Agricultural Center, 1994

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Abstract

Twenty two varieties of durum wheat were tested at the Safford Agricultural Center in 1994. One of the experimental lines, PH888-216, had the highest yield at 4152 pounds per acre. This yield was nearly 38% higher than Aldura, which has been the standard variety for many years. Durex was the highest yielding registered variety with a yield nearly 23% over that of Aldura. It also achieved a top score for quality.

Introduction

Durum wheat is a potential alternative crop in the Graham county area. Low prices over the past several years, however, have limited the production. Some interest was generated this year due to higher than normal prices, because of this interest, this trial was initiated.

Methods and Materials

Twenty two varieties of durum wheat were obtained from the breeders and seed companies that have an interest in durum wheat being grown in Arizona. Most of these same varieties were grown by Mike Ottman on the Maricopa Agricultural Center. A small plot, replicated field trial was developed for the comparison of these varieties. Plots were planted using a John Deere Van Brunt grain drill, seeding in 6 inch rows. The following crop history indicates the important features of the study.

Crop History:

Previous crop: Cotton

Soil type: Pima clay loam variant

Planting date: 16 December 1993

Seeding rate: Approximately 150 lbs/ac

Fertilizer: 200 lbs/ac of 16-20-0 broadcast pre-plant, 110 lbs/ac urea on 11 February and again on 18 March

Herbicide: None

Insecticide: None

Irrigation: Furrow, watered up and 7 irrigations (approximately 40 acre inches) Rainfall: 1.57 inches

Plot size: 2 rows (6 feet) wide by 35 feet long

Harvest date: 12 July, 1994

The plots were harvested using a Gleaner Model L combine, catching the grain from each plot in a 5 gallon bucket in the grain bin. These buckets were weighed using an electronic hanging scale and samples were taken to determine moisture and bushel weight and for further quality analysis. Plant height and stand counts were taken just prior to harvest. Samples were sent to the USDA/ARS Wheat Quality Lab in Fargo, ND for quality analysis.

Results and Discussion

The results of the durum wheat study are found in Table 1. PH888-216, one of the experimental lines, was the highest yielding variety with a yield almost 38% higher than the standard variety, Aldura. Durex was the highest yielding of the registered varieties with a yield almost 23% higher than Aldura and with a protein percent equaling that of

WestBred 881. Unfortunately, the protein sample on Aldura was lost, but it is felt that it would be equal to or just above the average for the trial. Protein percentages on several of the varieties were below 13. Perhaps our fertilizer nitrogen applications were too low for these varieties to reach their optimum protein content and yield.

Quality values from the samples submitted to Gary Hareland of the USDA Wheat Quality Laboratory in North Dakota are tabulated in Tables 2a and 2b. Not much detail will be given on these values in this paper, but minor and major faulting values are given at the bottom of the tables and each durum variety was scored against these values. The final score is in the last column of Table 2b which indicates their suitability for pasta.

The better varieties should be tested another year at this site.

Acknowledgments

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Table 1. Yields and other agronomic characteristics of durum wheat varieties grown on the Safford Agricultural Center, 1994.

Variety	Yield (lbs/ac)	Percent Aldura Yield	Percent Protein	Bushel Weight	Plant Height	Actual Seeding Rate	Plant Population
PH888-216	4151.8 a	137.6	13.1	57.5 abc	29.5 a	163	686070 a
Durex	3705.6 ab	122.8	14.2	57.5 abc	27.5 a	149	675180 a
D5317B	3660.3 abc	121.3	13.5	57.8 ab	25.3 a	166	664290 a
D8095	3652.8 abc	121.1	11.8	59.3 a	28.8 a	194	675180 a
D8241	3577.1 abcd	118.5	13.1	57.5 abc	28.5 a	178	653400 a
D5318B	3562.0 abcde	118.0	13.7	58.0 abc	26.3 a	177	686070 a
PH890-71	3539.3 abcde	117.3	13.2	58.3 ab	27.5 a	160	631620 ab
Mimos	3501.4 abcde	116.0	13.8	56.0 cd	24.3 a	163	609840 ab
D1138	3372.9 abcde	111.8	13.5	57.3 a-d	26.0 a	235	686070 a
WB Turbo	3319.9 abcde	110.0	13.1	57.3 a-d	25.8 a	154	664290 a
D8869	3108.2 bcde	103.0	13.5	58.3 ab	27.3 a	196	686070 a
Ocotillo	3100.6 bcde	102.8	13.1	57.3 a-d	25.3 a	155	631620 ab
PH888-260	3085.7 bcde	102.3	13.7	57.3 a-d	29.5 a	139	598950 ab
Aldura	3017.5 bcde	100.0	--	55.3 d	24.3 a	167	555390 b
Kronos	2896.5 bcde	96.0	13.3	56.5 bcd	26.3 a	163	653400 a
Duraking	2813.3 bcde	93.2	12.1	57.5 abc	27.3 a	151	675180 a
PH888-219	2798.1 bcde	92.7	12.6	57.8 abc	25.5 a	134	664290 a
PH888-103-3	2775.4 cde	92.0	12.7	57.8 abc	27.3 a	162	686070 a
Reva	2758.8 de	91.4	11.7	56.8 bcd	25.8 a	190	696960 a
WB881	2711.9 de	89.9	14.2	56.0 cd	28.3 a	143	664202 a
D8940	2648.4 e	87.8	12.9	56.0 cd	28.8 a	173	664290 a
PH891-55	1800.0 f	59.7	13.1	56.8 bcd	29.5 a	124	686070 a
Mean	3162.71	--	13.14	57.2	27	165.28	658845
LSD(05)	764.8	--	--	1.69	4.42	--	84234.9
CV(%)	22	--	--	2.45	12.6	--	9.39

Table 2a. Durum wheat quality evaluations on varieties grown on the Safford Agricultural Center, 1994.

Variety	Test Weight	Kernel Wt	% Lrg Kernels	% Sm Kernels	Kernel Ash	Kernel Protein ¹	Kernel Hardness	Falling ² No. (Sec)	% Total Extr ³	% Semo Extr
PH888-216	60.2	44.2	76	1	1.53	12.6	122	400	82.8	61.0
Durex	60.3	42.9	65	0	1.54	12.8	127	400	84.4	63.1
D5317B	60.9	44.2	69	1	1.57	12.4	129	400	84.7	63.2
D8095	61.8	45.7	67	0	1.49	11.1	115	400	83.7	64.0
D8241	-	-	-	-	-	-	-	-	-	-
D5318B	60.6	42.7	54	0	1.80	12.7	112	400	84.7	62.8
PH890-71	61.2	42.4	61	0	1.58	12.6	108	400	84.1	63.7
Minos	59.6	42.2	60	2	1.60	12.5	91	400	82.8	53.8
D1138	60.6	44.2	68	1	1.60	12.4	120	400	83.4	60.9
WB Turbo	60.4	46.5	72	0	1.47	12.2	130	400	84.6	64.1
D8869	61.0	44.2	52	0	1.53	13.0	121	400	82.8	63.7
Ocotillo	60.1	42.4	54	1	1.68	13.1	125	400	84.8	63.2
PH888-260	60.6	45.5	66	0	1.65	12.7	113	400	84.0	58.3
Aldura	-	-	-	-	-	-	-	-	-	-
Kronos	-	-	-	-	-	-	-	-	-	-
Duraking	60.6	41.0	53	0	1.61	12.1	105	400	84.0	63.0
PH888-219	60.2	44.2	76	1	1.53	12.6	122	400	82.8	61.0
PH888-103-3	59.7	45.7	69	0	1.62	12.8	121	400	84.6	64.3
Reva	60.2	42.0	57	1	1.84	13.3	118	400	81.8	55.0
WB881	59.8	45.7	67	1	1.58	12.3	120	400	84.7	62.9
D8940	60.0	39.4	45	1	1.58	11.1	97	400	81.3	57.4
PH891-55	-	-	-	-	-	-	-	-	-	-
Average	60.43	43.62	62.8	0.56	1.6	12.46	116.4	400	83.67	61.41
Std Average⁴	59.8	45.7	-	1	-	12.3	-	-	84.7	62.9
Min Flt Value⁵	57.6	43.6	-	6	-	12.5	-	-	82.2	59.9
Maj Flt Value⁶	56.7	40.6	-	11	-	11.5	-	-	81.2	58.9

1. Kernel protein is based on 14% moisture.
2. Semolina falling numbers above 300 are desired.
3. Semolina plus flour.
4. WB881 is the only standard variety in this trial.
5. Minor faulting values.
6. Major faulting values.

Table 2b. Durum wheat quality evaluations (continued).

Variety	Speck Count	% Semo Ash	Dust Color	Mixograph Score ¹	% Semo Protein	Visual Color	Cooked Wt. (gm)	Firmness Score ²	Residue ³	Total Score ⁴
PH888-216	33	0.68	7.50	3	11.5	8.60	31.0	5.81	5.6	3
Durex	57	0.62	7.20	3	11.6	8.70	32.2	5.85	5.4	4
D5317B	37	0.66	7.30	3	11.2	8.10	31.0	5.88	5.6	1
D8095	30	0.59	6.80	1	10.4	7.90	32.6	5.29	6.2	1
D8241	-	-	-	-	-	-	-	-	-	-
D5318B	23	0.74	7.50	3	11.8	8.30	30.5	6.48	5.5	3
PH890-71	37	0.63	7.20	3	11.6	8.50	32.4	5.98	5.7	4
Minos	17	0.64	7.40	5	12.4	8.10	30.4	6.22	5.6	2
D1138	47	0.63	7.20	4	11.6	8.50	32.2	5.96	6.1	4
WB Turbo	40	0.61	7.10	2	11.1	8.30	31.6	5.27	6.7	2
D8869	30	0.65	7.20	3	11.9	8.40	31.5	6.35	5.9	4
Ocotillo	20	0.61	7.10	3	12.2	8.40	31.1	6.29	5.7	4
PH888-260	-	0.65	7.30	5	12.0	-	-	-	-	4
Aldura	-	-	-	-	-	-	-	-	-	-
Kronos	-	-	-	-	-	-	-	-	-	-
Duraking	30	0.68	7.20	3	11.2	8.00	30.4	6.18	5.8	1
PH888-219	23	0.65	7.60	2	11.0	8.70	30.5	5.55	6.1	2
PH888-103-3	30	0.68	7.10	4	11.8	8.20	30.9	6.35	5.7	3
Reva	27	0.74	7.30	3	12.3	-	-	-	-	4
WB881	23	0.66	7.20	4	11.2	8.60	30.7	5.68	5.8	3
D8940	40	0.70	7.60	4	10.1	8.70	33.6	4.84	6.5	1
PH891-55	-	-	-	-	-	-	-	-	-	-
Average	32	0.66	7.30	3.2	11.49	8.38	31.41	5.87	5.87	2.8
Std Average ⁵	23	-	7.20	-	11.2	8.60	-	5.68	-	-
Min Flt Value ⁶	33	-	6.95	-	11.5	8.35	-	4.18	-	-
Maj Flt Value ⁷	38	-	6.75	-	11	8.15	-	3.43	-	-

1. Larger numbers for mixograph score indicate stronger mixing characteristics.
2. Cooked spaghetti firmness score.
3. Residue in water of cooked spaghetti.
4. 1 = no promise, 2 = little promise, 3 = some promise, 4 = good promise.
5. WB881 is the only standard variety in this trial.
6. Minor faulting values.
7. Major faulting values.