

Small Grain Variety Trials Safford Agricultural Center, 1998

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Abstract

Small plot replicate trials were established to test ten barley varieties, twenty one durum wheat varieties and seven varieties of bread/feed wheat. Yields were exceptionally high in 1998 which were attributed to overall growing conditions for the plants. Gustoe was the highest yielding barley variety with a yield of 8412 pounds per acre, YU894-162 (Western Plant Breeders) was the highest yielding durum wheat with a yield of 7986 pounds per acre and RSI 5 (Resources Seeds Inc.) was the highest yielding feed wheat. These varieties yielded 1458, 966 and 713 pounds per acre more than the number two varieties for barley, durum wheat and wheat, respectively.

Introduction

After one year with no wheat on the Agricultural Center, we have restarted the wheat variety testing program. The Karnal Bunt issue still exists in the state, but no further spore have been found at the higher elevations so the pressure has declined somewhat in the southeastern part of Arizona. The barley variety testing program continued through the years and along with the wheat studies, our objective is to provide current varietal evaluations for farmers who are able to fit small grains into their rotation. It is desirable to have a rotation instead of a cotton mono-culture in Graham county, but the economics of growing small grains over the past decade have not been very favorable.

Materials and Methods

Prior to planting the variety trials, the ground is prepared and beds are pulled and firmed, so seed placement will be somewhat consistent from top of beds to bottom of furrows. Plots were planted with a six-foot Van Brunt grain planter with fertilizer attachment, over two 36" beds. The cultural practices applied are described below in the crop history.

Crop History:

Previous crop: Cotton

Soil type: Pima clay loam variant

Planting date: 18 December 1997

Watered up: 7 January 1998

Seeding rate: Wheat 120 lbs/ac, Barley 200 lbs/ac

Fertilizer: 400 lbs/ac elemental sulphur and 200 lbs/ac of 16-20-0 broadcast pre-plant,
244 lbs/ac urea side dressed on 13 March

Herbicide: 2-4,D applied on 20 March to control broad-leafed weeds

Insecticide: None

Irrigation: Furrow, watered up and 9 irrigations applied at 45% soil water depletion (from AZSCHED)
(approximately 40 acre in)

Rainfall during the growing season: 2.8 inches

Plot size: 2 rows (6 feet) wide by 45 feet long

Harvest date: Barley 25 June, Wheat 29 June 1998

Heat Units (40/81 °F) from watering-up to harvest: Barley - 3079 hu, Wheat - 3182 hu

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 a hanging scale and samples were taken to determine moisture and bushel weight.

Results and Discussion

Results of the barley study are found in Table 1. Conditions were nearly ideal with the highest yielding variety yielding almost twice as much as the highest yielding variety in the previous year's trial (1). Yields as high as 4 tons per acre are achieved in other parts of the county on a regular basis, but on the salty soils of the Agricultural Center, this is a rare event. Gustoe, a strong variety for many years, was the highest yielding variety with Nebula, the highest yielding variety from 1997 coming in 4th place, nearly 24% lower yield than Gustoe. Coincidentally, Gustoe was the top yielding variety in the study in Marana in 1997 (2). In the table, Patti had the highest bushel weight and Max had the lowest. The average bushel weight was much higher than the average barley bushel weight of 48 pounds. In plant height, UC 337 was the tallest plant and Mucho was the shortest. The 1000 kernal weights were much higher than last year (1) and the average of 41.0 grams was much higher than the national average of 33.6 grams.

Table 2 contains information on the durum wheat study. The highest yielding variety was YU 894-162, a variety not tested in the area before, from Western Plant Breeders. In addition to its yield being 13% higher than the second variety, the bushel weight, 1000 kernal weight, percent protein and hard vitreous amber count (HVAC) were above the average for the trial and exceeded the values of WestBred 881 which has been the standard for quality. The average yield for this study exceeded the yield of the previous durum wheat variety trial on the Agricultural Center (3) by 1660 pounds. The reason for the high yields has not been fully explored, but probably relates to favorable climatic conditions and the addition of 400 pounds per acre of elemental sulphur. DuraKing, the high yielding variety in the previous trial came in next to last in this study.

Bread and feed wheat variety studies are reported in Table 3. The highest yielding variety, RSI 5 (Resources Seeds International, Woodland, CA) was placed in the trial because it was the leading variety in 5 counties in northern California in 1997 (4). RSI 5 yielded more than 700 pounds per acre more than Cuyama, but it must be noted that its quality is not the same. Its bushel weight, percent protein and HVAC were the lowest of those varieties tested. If Cuyama sold at 5¢ per pound then RSI 5 would have to sell for at least 4.5¢ per pound to produce as much income per acre. The yield genetics are present in RSI 5, the market place will have to determine if it is the best choice to plant in this area. As reported with the durum wheat, yields were significantly higher in 1997 than in our previous study.

References

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2. Ottman, M.J., S.H. Husman and D.A. Lindahl. 1997. Small grain variety evaluation at Marana, Maricopa, Paloma and Yuma, 1997. Forage and Grain, A College of Agriculture Report, The University of Arizona, Tucson, AZ. Series P-110, pp. 81-89.
3. Clark, L.J. and E.W. Carpenter. 1997. Small grain variety trials, Safford Agricultural Center, 1995. Forage and Grain, A College of Agriculture Report, The University of Arizona, Tucson, AZ. Series P-106, pp. 89-91.
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Table 1. Yields and other agronomic characteristics of barley varieties grown on the Safford Agricultural Center, 1998.

Variety	Source	Yield @ 10% Moisture (lbs/ac)	Percent of Gustoe Yield	Bushel Weight (lbs)	Plant Height (inches)	Percent Moisture	1000 Kernel Weight (gms)
Gustoe	WPB	8412 a*	100.0	54.5 abc	28.4 d	8.5 a	40.0 b
Barcott	WPB	6954 b	82.7	54.5 abc	27.8 de	7.8 d	42.5 ab
Commander	WWW	6717 bc	79.9	54.0 abc	28.8 cd	8.6 a	41.3 ab
Nebula	WPB	6414 bcd	76.2	55.0 ab	31.5 bc	8.4 ab	40.0 b
Horizon	WWW	6018 bcd	71.5	51.0 d	26.3 de	7.8 cd	40.0 b
Max	WWW	5685 cd	67.6	50.5 d	26.6 de	8.0 bcd	40.0 b
Patti	WWW	5545 d	65.9	55.3 a	25.1 de	8.7 a	42.5 ab
UC 337	UC	4463 e	53.1	54.5 abc	35.6 a	8.3 ab	40.0 b
B2 601	Busch	3402 ef	40.4	53.8 bc	32.9 ab	7.8 cd	43.8 a
Mucho	APB	3343 f	39.7	53.3 c	22.4 f	8.3 abc	40.0 b
Mean		5695.2		53.6	28.5	8.2	41.0
LSD(05)		1036.3		1.4	2.8	0.5	3.3
CV(%)		15.1		2.1	8.4	4.8	6.7

* Values followed by the same letter, within a column, are not significantly different at the 90% level of confidence using Duncan's Multiple Range test.

Table 2. Yields and other agronomic characteristics of durum wheat varieties grown on the Safford Agricultural Center, 1998.

Variety	Source	Yield @ 10% Moisture (lbs/ac)	Percent of WB 881	Bushel Weight (lbs)	Percent Moisture	Plant Height (inches)	1000 Kernel Wt (gms)	% Prot	HVA C
YU894-162	WPB	7986 a	113.8	61.5 bc	6.7 a-e	31.3 b-f	55.0 a	14.6	95.5
WB 881	WPB	7020 ab	100.0	61.3 bcd	6.5 a-f	31.0 b-f	53.8 a	13.8	65.4
D 3240	WWW	6402 bcd	91.2	61.3 bcd	6.5 a-f	31.6 b-f	52.5 a	13.7	95.5
YU 894-15	WPB	6298 b-e	89.7	60.5 de	6.7 a-e	33.8 abc	55.0 a	13.9	93.1
D 3117	WWW	6278 abc	89.4	61.5 bc	6.1 ef	30.0 ef	52.5 a	14.6	28.0
D 9430	WWW	6207 b-f	88.4	60.8 cde	6.8 ab	30.9 c-f	52.5 a	13.3	87.5
MOHAWK	WPB	6052 b-f	86.2	61.0 bcd	6.4 b-f	29.8 f	53.8 a	12.8	70.0
BRAVADU R	WWW	6024 b-g	85.8	60.8 cde	6.5 a-f	35.5 a	55.0 a	14.8	95.5
D95-434	APB	5827 c-h	83.0	61.0 bcd	6.5 a-f	32.5 b-f	55.0 a	13.9	72.4
CORTEZ	WPB	5757 c-h	82.0	62.5 a	6.6 a-e	33.8 abc	53.0 a	13.3	93.5
D94-1	APB	5728 d-h	81.6	61.3 bcd	6.5 a-f	33.3 a-d	55.0 a	13.2	92.0
DUREX	WWW	5610 d-i	79.9	60.0 e	6.8 abc	30.3 ef	53.8 a	14.0	84.0
OCOTILLO	APB	5504 d-i	78.4	61.3 bcd	6.5 a-f	31.5 b-f	53.0 a	13.8	88.2
D95-412	APB	5441 d-i	77.5	61.8 ab	6.2 c-f	32.9 a-e	55.0 a	14.3	78.0
TACNA	WPB	5432 d-i	77.4	61.5 bc	7.1 a	30.9 c-f	53.0 a	15.2	96.5
KOFA	WPB	5341 d-i	76.1	61.0 bcd	5.9 f	33.4 abc	53.8 a	14.5	79.1
REVA	WWW	5228 e-i	74.5	60.5 de	6.6 a-e	32.8 a-f	53.8 a	14.7	72.0
YU 893-24	WPB	5100 f-i	72.7	61.8 ab	6.5 b-f	31.6 b-f	53.0 a	14.4	87.6
RIA L6046	WWW	4902 ghi	69.8	61.3 bcd	6.1 def	33.9 ab	53.8 a	13.1	83.0
DURAKING	WWW	4754 hi	67.7	60.8 cde	6.3 b-f	30.4 def	52.5 a	14.1	95.7
KRONOS	APB	4574 i	65.2	61.0 bcd	6.7 a-d	32.3 b-f	55.0 a	14.7	76.0
Mean		5812.7	82.802	61.1	6.5	32.1	53.8	14.0	82.3
LSD(05)		1139.2	16.228	1.0	0.6	2.9	2.6	—	—
CV(%)		16.6	0.2365	1.3	8.4	7.7	4.2	—	—

* Values followed by the same letter, within a column, are not significantly different at the 90% level of confidence using Duncan's Multiple Range test.

Table 3. Yields and other agronomic characteristics of wheat varieties grown on the Safford Agricultural Center, 1998

Variety	Source	Yield @ 10% Moisture (lbs/ac)	Bushel Weight (lbs)	Percent Moisture	Plant Height (inches)	1000 Kernel Weight (gms)	Percent Protein	HVAC
RSI 5	Resource Sds	7122 a	59.8 c	6.9 a	29.1 ab	53.8 ab	11.3	36.8
Cuyama	WPB	6409 ab	62.0 ab	7.3 a	28.3 abc	55.0 a	13.0	75.6
FMC 8631-1		5926 abc	63.3 a	7.3 a	25.8 c	53.8 ab	14.1	75.0
Brooks	WPB	5845 abc	63.3 a	7.4 a	30.4 a	53.8 ab	13.7	65.4
Cavalier	WWW	5450 bc	61.3 b	7.3 a	26.9 bc	51.8 ab	13.6	75.0
Rich 1	WWW	4914 bc	61.5 b	7.7 a	31.1 a	52.5 ab	13.8	69.2
Poco Red		4710 c	62.3 ab	6.0 b	28.5 abc	50.0 b	13.5	69.2
Mean		5768.1	61.9	7.1	28.6	52.9	13.3	66.6
LSD(05)		1532.9	1.3	0.8	3.3	4.3	--	--
CV(%)		21.7	1.8	9.4	9.4	6.7	--	--

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