

Final Report

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Small Grains Variety Testing

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Small Grains Variety Evaluation at Maricopa and Yuma, 2009

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Summary

Small grain varieties are evaluated each year by University of Arizona personnel. The purpose of these tests is to characterize varieties in terms of yield and other attributes. Variety performance varies greatly from year to year and several site-years are necessary to adequately characterize the yield potential of a variety. A summary of small grain variety trials conducted by the University of Arizona can be found online at <http://ag.arizona.edu/pubs/crops/az1265.pdf>.

Introduction

Small grain varieties were tested as part of the on-going effort to assess variety productivity and characteristics. Barley, durum, and wheat commercial cultivars and experimental lines were tested. The purpose of these tests is to characterize varieties in terms of yield potential, relative maturity, quality, and other characteristics. Small plot variety trials do not substitute for localized on-farm testing of new varieties. Varieties are known to differ in their response to specific management regimes and weather conditions. A summary of small grain variety trials conducted by the University of Arizona is available from your local Cooperative Extension office or online at <http://ag.arizona.edu/pubs/crops/az1265.pdf>.

Procedure

Barley, durum, and wheat varieties were evaluated at the following locations: Maricopa by the University of Arizona and Yuma (durum) and Casa Grande (barley) by Western Plant Breeders. The trial at Yuma consisted of a normal planting on Jan 8 and a late planting on Feb 1. The trial conducted by World Wide Wheat is not included in this report due to poor growing conditions and low yield. At all locations, the seed was planted with a cone planter in seven rows spaced 7 inches apart and 20 ft long. The seeding rate was approximately 100 lbs/acre for durum and wheat varieties and 85 lbs/acre for barley varieties. The experimental design was a randomized complete block with 4 replications, 15-16 barley entries, and 24-35 durum (or wheat at Maricopa) entries. Growing conditions at each site are listed in Table 1. The following data was collected: grain yield, test weight, plant height, lodging, heading, flowering (Maricopa, UA only), physiological maturity (Maricopa, UA only), grain protein, and HVAC. Grain was harvested with small plot combines and yields are expressed on an "as is" moisture basis. HVAC was determined from 10 g of seed. Grain protein was determined using the NIRS (WPB) or a C/N analyzer (UA) and expressed on a 12% moisture basis. Flowering is defined as when about half of the heads are shedding pollen and physiological maturity is defined as when the glumes turn brown. Abbreviations for the sources of varieties are: APB = Arizona Plant Breeders, UA = University of Arizona, WPB = Western Plant Breeders, WWW = World Wide Wheat, UC = University of California, RSI = Resource Seeds Inc.

Discussion

This growing season was characterized by above average temperature and low rainfall (Table 2). Temperatures were especially warm during the months of January and May. Temperatures during April were below average.

Yield and plant characteristics of the varieties are presented for the various locations in Tables 3-6 and a summary of the grain yields at all locations is presented in Table 7. The WPB barley trial at Casa Grande had low yields (5105 lbs/acre) but not below the threshold level of 5000 lbs/acre where I do not report the data. The trial at Maricopa sustained bird damage in some plots, and plots with bird damage were excluded from the yield analysis. The birds did not damage the barley, but they damaged some of the durum plots and damaged enough of the wheat plots that yields could not be reported.

Several locations and years are needed to accurately assess variety performance. The results of this trial are most useful when combined with data from previous years. A summary of small grain variety trials conducted by the University of Arizona can be found online at <http://ag.arizona.edu/pubs/crops/az1265.pdf>.

Acknowledgments

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Table 1. Cultural practices for the small grains variety trials at the various locations. The durum at Yuma was planted at two dates, 2 reps normal and 2 reps late, but the data is presented as on average of these two dates.

Cultural information	Maricopa (U of A)	Durum Yuma (WPB)	Durum Yuma Late Planting (WPB)	Barley Casa Grande (WPB)
Previous crop	Corn	Lettuce	Lettuce	Sorghum
Soil texture	Sandy clay loam	Clay loam	Clay loam	Sandy clay loam
Planting date	12/12/08	1/8/09	2/1/09	1/20/09
Irrigations	7 12/12, 1/28, 2/25, 3/13, 3/27, 4/9, 4/22	6 1/8, 3/1, 3/26, 4/12, 4/26, 5/8	7 2/1, 3/1/ 3/26, 4/12, 4/26, 5/8, 5/19	Unknown
Nitrogen (lbs N/a)	230 12/12: 46 as 46-0-0 1/28: 46 as 46-0-0 2/25: 46 as 46-0-0 3/13: 46 as 46-0-0 3/27: 46 as 46-0-0	225 3/1: 100 as 32-0-0 3/26: 100 as 32-0-0 4/12: 25 as 32-0-0	225 3/1: 100 as 32-0-0 3/26: 100 as 32-0-0 4/12: 25 as 32-0-0	Unknown
Phosphorus (lbs P ₂ O ₅ /acre)	100	0	0	Unknown
Pesticides	None	None	None	Unknown
Harvest date	6/3	6/2	6/10	6/11

Table 2. Climatic data from AZMET for Maricopa and Yuma Valley during the 2009 growing season compared to the long-term average.

Climate variable	Unit	Year(s)	Dec	Jan	Feb	Mar	Apr	May	Dec-May
<u>Maricopa</u>									
Max Temp.	°F	2009	65	70	72	79	84	98	78
	°F	Avg	65	66	70	77	85	95	76
Min Temp.	°F	2009	38	38	39	45	49	66	46
	°F	Avg	35	36	39	44	51	60	44
Ppt.	inches	2009	1.06	0.11	0.52	0.00	0.08	0.15	1.92
	inches	Avg	0.62	0.72	0.85	0.79	0.26	0.20	3.43
<u>Yuma</u>									
Max Temp.	°F	2009	66	73	73	79	83	99	79
	°F	Avg	68	69	73	79	86	94	78
Min Temp.	°F	2009	43	45	44	45	51	63	48
	°F	Avg	41	42	45	49	53	60	48
Ppt.	inches	2009	0.44	0.19	0.43	0.00	0.00	0.00	1.06
	inches	Avg	0.35	0.31	0.35	0.34	0.15	0.04	1.54

Table 3. Barley variety yield results from **Maricopa (UA)**, 2009.

Entry	Source	Grain Yield ^a lbs/acre	Test Weight lbs/bu	Plant Height inches	Lodging %	Heading	Flowering	Maturity
Chico	WPB	7449	50.4	26	0	3/22	3/20	4/29
Cochise	WPB	7272	51.2	28	0	3/10	3/09	4/22
Gustoe	WPB	8342	51.6	28	0	3/21	3/19	4/26
Nebula	WPB	7709	52.0	31	0	3/16	3/15	4/26
Commander	WWW	7696	50.5	30	0	3/24	3/22	4/30
Max	WWW	9100	51.2	30	0	3/21	3/19	5/03
Baretta	APB	7312	50.8	29	0	3/20	3/19	4/26
YU505-056	WPB	8190	47.7	31	0	3/17	3/16	4/29
YU505-060	WPB	7952	49.1	30	0	3/16	3/14	4/29
YU505-089	WPB	7073	49.4	24	0	3/17	3/16	4/27
ARGBA2042	WWW	5964	52.6	36	0	3/10	3/10	4/19
BA4513	WWW	7981	49.8	34	0	3/22	3/20	4/29
BA8017	WWW	7713	50.1	28	0	3/23	3/21	5/04
B00-219	APB	7522	51.2	29	0	3/13	3/12	4/23
Unkown 2- row	APB	6768	53.5	34	0	3/15	3/14	4/20
Avg	---	7603	50.7	30	0	3/18	3/16	4/27

^a Grain yield: LSD (5%) = 575 lbs/acre and cv = 4.6%.

Table 4. Barley variety yield results from **Casa Grande (WPB)**, 2009.

Entry	Source	Grain Yield ^a lbs/acre
Chico	WPB	4236
Cochise	WPB	4590
Gustoe	WPB	5431
Nebula	WPB	4991
Commander	WWW	5021
Max	WWW	5912
Baretta	APB	5027
YU505-056	WPB	5563
YU505-060	WPB	5220
YU505-089	WPB	4031
ARGBA2042	WWW	5587
BA4513	WWW	6061
BA8017	WWW	4906
B00-219	APB	5136
Unkown 2- row	APB	4483
ISHI	UC	5491
Avg	---	5105

^a Grain yield: LSD (5%) = 806 lbs/acre and cv = 11.1%.

Table 5. Durum and wheat variety yield results from **Maricopa (UA)**, 2009. Grain yield is not reported for the wheat entries due to bird damage.

Entry	Source	Grain Yield ^a lbs/acre	Test Weight lbs/bu	Plant Height inches	Lodging %	Heading	Flower- ing	Maturity %	Grain Protein %	HVAC %
<u>Durum</u>										
Alamo	WPB	6942	64.0	36	0	3/17	3/21	4/30	14.1	100
Havasu	WPB	6309	63.6	34	0	3/17	3/21	4/27	13.9	100
Orita	WPB	7004	61.9	34	0	3/22	3/27	5/03	12.5	100
WPB-881	WPB	6659	62.7	35	0	3/17	3/21	4/28	13.7	99
Crown	WWW	7284	61.3	36	0	3/20	3/23	5/03	12.7	100
Duraking	WWW	7600	63.1	33	0	3/20	3/24	5/02	12.5	100
Q-Max	WWW	5983	59.8	37	0	3/25	3/29	5/05	13.6	100
Kronos	APB	7263	62.3	33	0	3/16	3/19	4/28	14.1	100
Sky	APB	6356	61.9	31	0	3/18	3/22	5/02	14.5	100
Ocotillo	APB	6172	62.3	36	0	3/17	3/21	4/30	14.4	100
Westmore	APB	6955	63.1	33	0	3/16	3/21	4/29	13.4	100
YU802-4	WPB	6812	60.6	35	0	3/24	3/30	5/03	13.3	100
YU803-42	WPB	6582	64.1	34	0	3/14	3/17	4/25	14.1	100
YU803-52	WPB	7129	63.4	35	0	3/16	3/21	4/27	13.4	99
YU803-54	WPB	7073	63.1	32	0	3/17	3/22	4/28	13.6	99
ARGD7050	WWW	6547	61.5	38	0	3/18	3/22	5/02	12.9	98
D65750	WWW	6754	63.3	34	0	3/25	3/30	5/05	12.6	100
Dking206white	WWW	7625	63.2	34	0	3/17	3/21	5/02	12.7	99
UT12074	WWW	7440	63.1	34	0	3/16	3/21	5/01	13.8	99
D05AZ-335	APB	7369	62.8	28	0	3/17	3/21	5/02	13.2	99
D1-2	APB	7020	61.8	32	0	3/17	3/21	5/02	13.9	100
D1-1-5P	APB	6251	62.8	36	0	3/20	3/24	5/02	13.1	100
D2-97	APB	6978	63.0	34	0	3/15	3/19	4/26	13.4	100
Fortissimo	RSI	7638	62.1	32	0	3/22	3/28	5/02	13.5	100
RSI 59	RSI	7392	62.2	33	0	3/24	3/29	5/04	12.8	98
Volante	RSI	7441	63.4	32	0	3/19	3/24	5/03	13.0	99
Maestrале	Allstar	6905	63.8	38	0	3/17	3/21	4/28	14.3	100
Saragolla	Allstar	6960	63.7	34	0	3/18	3/22	5/02	12.3	98
Levante	Allstar	6328	60.8	36	0	3/28	4/01	5/06	14.3	100
Avg	---	6923	62.6	34	0	3/18	3/23	4/30	13.4	100
<u>Wheat</u>										
Blanca Fuerte	RSI	---	63.6	30	0	3/18	3/22	5/01	12.1	---
Blanca Grande	RSI	---	63.6	35	0	3/14	3/18	4/26	13.6	---
Blanca Royal	RSI	---	62.3	33	0	3/16	3/20	4/25	12.9	---
Sagittario	Allstar	---	61.6	31	0	3/24	3/29	5/02	12.2	---
Vaiiolet	Allstar	---	61.6	26	0	3/29	4/01	5/05	13.2	---
Yecora Rojo	UC	---	62.8	31	0	3/16	3/20	4/26	14.3	---
Avg	---	---	62.6	31	0	3/19	3/23	4/29	13.1	---

^a Grain yield: LSD (5%) = 658 lbs/acre and cv = 5.8%.

Table 6. Durum variety yield results from **Yuma (WPB)**, 2009.

Entry	Source	Grain Yield ^a lbs/acre	Test Weight lbs/bu	Plant Height inches	Lodging %	Heading	Grain Protein %	HVAC %	Leaf Rust 0-9	Stripe Rust 0-9
<u>Durum</u>										
Alamo	WPB	7254	63.5	35	15	4/10	14.1	100	4	5
Havasu	WPB	7867	63.4	33	43	4/09	13.7	99	2	1
Orita	WPB	7576	59.9	34	13	4/13	14.8	100	3	3
WPB-881	WPB	7223	61.5	35	18	4/10	14.6	100	3	6
Crown	WWW	7140	58.3	34	33	4/14	14.2	100	0	0
Duraking	WWW	7675	61.3	33	3	4/11	13.0	100	1	2
Q-Max	WWW	6928	59.1	36	15	4/16	14.1	100	1	0
Kronos	APB	8403	62.5	33	48	4/06	13.8	100	2	2
Sky	APB	6626	60.0	30	18	4/10	13.9	100	2	0
Ocotillo	APB	7001	61.9	36	38	4/12	14.2	100	3	6
Westmore	APB	7431	60.5	33	85	4/08	14.8	100	3	0
YU802-4	WPB	7758	61.0	34	35	4/16	14.2	100	2	2
YU803-42	WPB	8551	64.1	33	10	4/04	14.6	100	2	3
YU803-52	WPB	7986	63.6	33	25	4/09	13.9	100	3	3
YU803-54	WPB	6829	62.2	30	0	4/10	14.6	100	3	6
ARGD7050	WWW	7454	61.1	35	3	4/12	14.0	100	1	0
D65750	WWW	8001	62.5	33	15	4/17	13.5	99	1	0
Dking206white	WWW	8541	62.7	33	5	4/11	13.1	100	1	0
UT12074	WWW	7719	62.4	33	3	4/07	14.3	100	2	2
D05AZ-335	APB	7185	60.1	26	0	4/10	14.7	100	2	0
D1-2	APB	7454	60.4	31	10	4/14	14.6	100	1	0
D1-1-5P	APB	6637	60.9	35	88	4/13	14.0	100	1	1
D2-97	APB	7817	62.8	34	40	4/06	13.2	100	2	0
ATIL-2001	CIMMYT	7716	---	35	78	4/17	---	---	2	0
Avg	---	7532	61.5	33	26	4/11	14.1	100	2	2

^a Grain yield: LSD (5%) = 798 lbs/acre and cv = 7.5%.

Table 7. Summary of small grain variety yield results for 2009 from Maricopa (U of A), Yuma (WPB durum) and Casa Grande (WPB barley).

Entry	Source	Grain yield (% of location average for these entries)			
		Maricopa (U of A)	Yuma (durum) or Casa Grande (barley) (WPB)	Mean	Standard Deviation
<u>Barley</u>					
Chico	WPB	98	83	91	10
Cochise	WPB	96	90	93	4
Gustoe	WPB	110	107	108	2
Nebula	WPB	101	98	100	2
Commander	WWW	101	99	100	2
Max	WWW	120	116	118	2
Baretta	APB	96	99	98	2
YU505-056	WPB	108	110	109	1
YU505-060	WPB	105	103	104	1
YU505-089	WPB	93	79	86	10
ARGBA2042	WWW	78	110	94	22
BA4513	WWW	105	119	112	10
BA8017	WWW	101	97	99	3
B00-219	APB	99	101	100	2
Unkown 2- row	APB	89	88	89	1
<u>Durum</u>					
Alamo	WPB	101	96	99	3
Havasu	WPB	92	105	98	9
Orita	WPB	102	101	101	1
WPB-881	WPB	97	96	96	1
Crown	WWW	106	95	100	8
Duraking	WWW	111	102	106	6
Q-Max	WWW	87	92	90	4
Kronos	APB	106	112	109	4
Sky	APB	92	88	90	3
Ocotillo	APB	90	93	91	2
Westmore	APB	101	99	100	2
YU802-4	WPB	99	103	101	3
YU803-42	WPB	96	114	105	13
YU803-52	WPB	104	106	105	2
YU803-54	WPB	103	91	97	9
ARGD7050	WWW	95	99	97	3
D65750	WWW	98	106	102	6
Dking206white	WWW	111	114	112	2
UT12074	WWW	108	103	105	4
D05AZ-335	APB	107	95	101	8
D1-2	APB	102	99	101	2
D1-1-5P	APB	91	88	90	2
D2-97	APB	102	104	103	2