

Small Grains Variety Evaluation at Arizona City, Coolidge, Maricopa and Yuma, 2012

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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, Coolidge by World Wide Wheat, Arizona City by Arizona Plant Breeders, and Yuma by WestBred. 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 3-4 replications, and various numbers of barley, durum, and wheat entries. Growing conditions at each site are listed in Table 1. The following data was collected: grain yield, test weight, seed weight, plant height, lodging, heading, physiological maturity, grain protein, and HVAC. Grain was harvested with small plot combines and yields are expressed on an “as is” moisture basis. Test weight was calculated from the weight of 1 pint of grain. Seed weight was determined from 200 seed. HVAC was determined from 10 g of seed. Grain protein was determined from total N multiplied by 5.7 for durum and wheat and 6.25 for barley, and expressed on a 12% moisture basis. 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.

Discussion

Yield and plant characteristics of the varieties are presented for the various locations in Tables 2-10 and a summary of the grain yields at all locations is presented in Table 11. This year was characterized by several very hot days in April, which could have limited yields. 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>.

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Table 1. Cultural practices for the small grains variety trials at the various locations.

Cultural information	Arizona City (APB)	Coolidge (WWW)	Maricopa (UA)	Yuma Durum (WPB)	Yuma Barley (WPB)
Previous crop	Watermelon	Cotton	Sorghum	Lettuce	Cotton
Soil texture	Fine sandy loam	Silty Loam	Sandy Loam	Sandy clay loam	Sandy clay loam
Nominal Planting date	12/20/11	12/7/11	11/29/11	2/02/12	12/22/11
Irrigation dates (amount)	1/4 (8.2 in.)	12/12/ (6 in.)	11/30 (6.36 in.)		
	2/6 (5.7 in.)	1/1 (5 in.)	2/1 (5.08 in.)		
	3/5 (5.9 in.)	2/1 (5 in.)	2/24 (3.81 in.)		
	3/26 (5.4 in.)	2/27 (5 in.)	3/14 (3.39 in.)		
	4/9 (5.7 in.)	3/15 (5 in.)	3/28 (5.51 in.)		12/22 (6)
	4/23 (6.7 in.)	4/13 (5 in.)	4/12 (5.08 in.)		
	5/9 (6.2 in.)		4/24 (6.78 in.)		
	Total = 43.8 in.	Total = 31 in.	Total = 36.01 in.		
Nitrogen dates (lbs N/acre, fertilizer)	1/4: 53 as 27-27-0	12/6:15 as 11-52-0	11/30: 46 as 46-0-0		
	2/6: 34 as 32-0-0	1/1: 70 as 32-0-0	11/30: 32 as 16-20-0		
	3/5: 37 as 32-0-0	2/1: 70 as 32-0-0	2/1: 53 as 32-0-0		
	3/26: 50 as 32-0-0	2/27: 70 as 32-0-0	2/24: 98 as 32-0-0		
	4/9: 39 as 32-0-0	3/15: 25 as 32-0-0	3/28: 65 as 32-0-0		
	4/23: 18 as 32-0-0				
	Total = 231 lbs N/a	Total = 250 lbs N/a	Total = 294 lbs N/a		
Phosphorus (date, lbs P ₂ O ₅ /a, fertilizer)	11/21: 53 as 27-27-0 10 T. manure pre-plant	12/6: 75 as 11-15-0	12/15: 40 as 16-20-0	None	
Pesticides (date)	Buctril (2/1)	Harmony (2/24)	None	Affinity	
Harvest date	6/18/12	6/5	5/26	7/7	

Table 2. Barley variety yield results from **Arizona City (APB)**, 2012.

Entry	Source	Grain yield ^a	Test weight	Seed weight	Grain protein
		lbs/acre	lbs/bu	mg	%
Baretta	APB	5161	53.3	48.1	11.0
Kopious	APB	4924	53.3	46.2	10.1
Chico	WPB	4554	51.2	39.0	10.6
Cochise	WPB	4627	53.2	42.0	9.3
Gustoe	WPB	4382	55.0	43.8	8.9
Nebula	WPB	4103	52.1	47.0	10.7
Commander	WWW	4188	53.5	45.3	10.2
Max	WWW	3703	53.3	48.3	9.5
BA4513	WWW	5320	52.9	45.5	10.1
NZBA2724	WWW	3571	56.1	46.2	11.0
SW2614	WWW	4237	56.7	42.3	10.7
Avg.	---	4434	53.7	44.9	10.2

^a Grain yield: LSD (5%) = 1156 lbs/acre and cv = 17.0%.

Table 3. Barley variety yield results from **Maricopa (UA)**, 2012.

Entry	Source	Grain yield ^a	Test weight	Seed weight	Plant height	Lodging	Heading	Maturity	Grain protein
		lbs/acre	lbs/bu	mg	inches	%			%
Baretta	APB	4474	55.0	48.3	28	19	3/15	4/23	10.1
Kopious	APB	4483	54.5	43.3	27	19	3/06	4/23	10.5
Chico	WPB	4598	54.4	40.6	25	6	3/13	4/23	10.8
Cochise	WPB	3391	54.6	40.3	27	6	3/06	4/23	10.2
Gustoe	WPB	4937	54.1	44.3	27	0	3/17	4/24	10.2
Nebula	WPB	4652	53.9	47.5	28	6	3/12	4/23	11.3
Commander	WWW	4444	53.2	44.6	28	6	3/17	4/24	10.2
Max	WWW	5248	53.4	47.8	29	6	3/19	4/26	9.7
BA4513	WWW	5215	52.3	43.2	32	6	3/18	4/28	9.3
NZBA2724	WWW	4652	55.0	50.9	32	13	3/22	4/23	10.4
SW2614	WWW	3866	55.0	42.6	30	0	3/20	4/23	10.8
Moravian 69	Coors	4910	55.1	50.6	29	6	3/19	4/23	11.3
Avg.	---	4573	54.2	45.3	28	8	3/15	4/24	10.4

^a Grain yield: LSD (5%) = 797 lbs/acre and cv = 12.1%.

Table 4. Barley variety yield results from **Yuma (WPB)**, 2012.

Entry	Source	Grain yield ^a	Test weight	Seed weight	Plant height	Heading	Grain protein
		lbs/acre	lbs/bu	mg	inches		%
Baretta	APB	5900	50.4	43.8	32	3/28	11.8
Kopious	APB	7601	50.9	43.0	30	3/23	12.0
Chico	WPB	6953	51.2	35.1	27	3/27	10.7
Cochise	WPB	7236	50.0	39.6	31	3/23	10.7
Gustoe	WPB	5630	49.0	38.3	31	3/27	11.1
Nebula	WPB	8114	52.4	48.4	35	3/26	11.7
Commander	WWW	5724	44.0	35.3	29	3/28	13.0
Max	WWW	6386	48.8	41.0	31	3/29	13.7
BA4513	WWW	4671	43.8	35.2	33	3/18	12.9
NZBA2724	WWW	4091	49.6	41.1	36	2/20	12.1
SW2614	WWW	5738	50.2	34.3	36	2/20	14.7
Avg.	---	6171	48.8	39.2	32	3/20	12.2

^a Grain yield: LSD (5%) = 917 lbs/acre and cv = 10.3%.

Table 5. Barley variety yield results from **Coolidge (WWW)**, 2012.

Entry	Source	Grain yield ^a	Test weight	Seed weight	Plant height	Maturity	Grain protein
		lbs/acre	lbs/bu	mg	inches		%
Baretta	APB	5212	49.8	44.8	32	5/11	11.7
Kopious	APB	5168	50.4	45.5	26	5/07	11.7
Chico	WPB	5377	50.8	34.7	28	5/16	10.8
Cochise	WPB	5168	49.1	39.2	28	5/10	12.0
Gustoe	WPB	5735	50.3	43.6	30	5/13	10.2
Nebula	WPB	5173	50.7	47.9	38	5/09	11.6
Commander	WWW	5636	48.8	43.4	28	5/14	10.8
Max	WWW	6045	50.2	45.3	23	5/17	10.2
BA4513	WWW	6545	50.7	47.1	32	5/17	9.8
NZBA2724	WWW	5279	53.0	47.2	30	5/08	10.9
SW2614	WWW	5283	52.6	41.0	34	5/11	12.6
Avg.	---	5365	50.6	43.6	32	5/11	11.1

^a Grain yield: LSD (5%) = 880 lbs/acre and cv = 10.0%.

Table 6. Durum and wheat variety yield results from **Arizona City (APB)**, 2012.

Entry	Source	Grain yield ^a	Test weight	Seed weight	HVAC	Grain protein
		lbs/acre	lbs/bu	mg	%	%
				<u>Durum</u>		
Helios	APB	5467	64.0	52.4	98	13.1
Kronos	APB	4873	63.5	61.8	99	12.7
Sky	APB	4872	62.2	44.2	100	13.5
Westmore	APB	5456	63.4	47.8	100	13.9
Havasu	WPB	4972	64.9	54.6	99	13.0
Orita	WPB	5425	63.2	58.6	100	13.4
WB-Mead	WPB	5140	63.6	52.7	99	12.3
WPB-881	WPB	4856	62.5	56.6	100	13.5
Crown	WWW	5500	61.3	50.2	98	12.7
Duraking	WWW	4959	64.0	50.8	99	12.0
Platinum	WWW	4147	63.0	48.2	99	12.5
Q-Max	WWW	5792	61.3	51.3	100	12.0
YU806-93	WPB	5008	63.8	51.4	97	13.5
D2472	WWW	5496	61.9	54.0	99	13.4
D5384-2-1-1	WWW	5544	62.3	44.6	99	11.6
D8270-4	WWW	4869	63.6	47.5	83	12.1
UT0712	WWW	4885	62.7	56.1	94	13.0
CP-1	APB	6332	64.4	50.8	97	11.0
D1-2	APB	4555	62.4	58.2	83	12.9
IM-1	APB	6452	64.7	54.7	92	11.5
Avg.	---	5230	63.1	52.3	97	12.7
				<u>Wheat</u>		
Yecora Rojo	UC	5461	64.0	47.5	100	12.8
Joaquin	WPB	5696	64.5	48.1	98	12.2
BR2306	WWW	4999	62.8	48.7	83	11.4
BR3677	WWW	4909	60.6	39.2	99	13.6
CNBR9302	WWW	5287	62.3	40.9	98	11.2
NM-1	APB	6295	63.9	46.9	72	10.6
MC-1	APB	6290	62.7	48.0	87	11.6
W9-3AL	APB	5391	63.3	42.7	96	12.0
Avg.	---	5488	63.4	44.1	94	12.0

^a Grain yield: LSD (5%) = 826 lbs/acre and cv = 10.5% for durum and LSD (5%) = 726 lbs/acre and cv = 8.6% for wheat.

Table 8. Durum and wheat variety yield results from **Maricopa (UA)**, 2012.

Entry	Source	Grain yield ^a lbs/acre	Test weight lbs/bu	Seed weight mg	Plant height inches	Lodging %	Heading	Maturity %	HVAC %	Grain protein %
Durum										
Helios	APB	6371	62.2	48.1	36	0	3/17	5/01	98	13.7
Kronos	APB	6440	62.5	55.8	35	0	3/17	5/01	99	13.6
Sky	APB	5596	60.9	43.7	33	0	3/17	5/02	100	13.6
Westmore	APB	5776	62.4	46.9	35	0	3/17	5/02	100	15.5
Havasu	WPB	6101	64.0	53.0	37	0	3/17	5/02	100	13.8
Orita	WPB	6322	62.2	53.2	34	0	3/25	5/04	100	15.4
WB-Mead	WPB	6005	63.0	47.5	36	0	3/25	5/05	100	13.8
WPB-881	WPB	5968	61.8	53.7	36	0	3/17	5/02	100	14.0
Crown	WWW	5000	60.6	51.9	38	0	3/23	5/07	99	13.9
Duraking	WWW	6398	63.4	47.1	34	0	3/20	5/03	100	13.9
Platinum	WWW	4731	61.7	43.5	32	0	3/23	5/03	100	14.7
Q-Max	WWW	6174	60.5	48.4	40	0	3/25	5/03	100	13.9
YU806-93	WPB	6250	62.8	50.6	35	0	3/20	5/02	100	14.4
D2472	WWW	5406	61.9	53.6	39	0	3/25	5/04	98	13.1
D5384-2-1-1	WWW	6643	61.6	43.6	36	6	3/25	5/03	91	13.2
D8270-4	WWW	4725	62.8	41.9	35	0	3/26	5/10	99	13.7
UT0712	WWW	6138	62.4	57.2	35	0	3/17	5/02	100	14.4
CP-1	APB	6489	63.6	50.5	38	6	3/25	5/04	94	12.5
D1-2	APB	5926	61.7	56.7	33	0	3/22	5/03	100	14.9
IM-1	APB	6973	63.6	48.5	36	0	3/23	5/03	97	13.0
Maestrale	Allstar	5484	63.9	49.7	38	0	3/25	5/02	100	13.6
Saragolla	Allstar	5433	64.2	51.5	35	0	3/25	5/03	97	13.3
Avg.	---	5968	62.5	50.3	36	1	3/21	5/03	99	13.8
Wheat										
Yecora Rojo	UC	4280	62.6	46.5	32	0	3/17	5/02	100	13.3
Joaquin	WPB	4985	62.8	46.8	36	0	3/16	4/29	100	12.6
BR2306	WWW	4359	62.2	44.8	45	0	3/22	5/02	98	11.9
BR3677	WWW	3666	60.7	36.1	41	0	3/26	5/10	100	14.4
CNBR9302	WWW	4377	61.1	35.8	43	0	3/26	5/04	100	11.7
NM-1	APB	5982	62.5	42.9	37	0	3/25	5/04	83	11.2
MC-1	APB	4695	62.2	46.8	34	0	3/25	5/03	87	11.8
W9-3AL	APB	4917	61.7	42.1	33	0	3/25	5/03	100	12.3
Avg.	---	4658	62.0	42.7	37	0	3/23	5/03	96	12.4

^a Grain yield: LSD (5%) = 619 lbs/acre and cv = 7.3% for durum and LSD (5%) = 817 lbs/acre and cv = 11.9% for wheat.

Table 9. Durum and wheat variety yield results from **Yuma (WPB)**, 2012.

Entry	Source	Grain yield ^a	Test weight	Seed weight	Plant height	Lodging	Heading	HVAC	Grain Protein
		lbs/acre	lbs/bu	mg	inches			%	%
<u>Durum</u>									
Helios	APB	5466	61.9	39.2	28	55	4/17	99	14.4
Kronos	APB	4152	61.6	46.9	30	90	4/17	99	14.2
Sky	APB	4627	59.8	36.1	27	23	4/21	99	13.6
Westmore	APB	4110	62.1	40.6	29	65	4/19	98	14.7
Havasus	WPB	4307	63.1	46.2	29	65	4/21	100	13.7
Orita	WPB	4475	60.8	57.2	30	30	4/22	99	17.2
WB-Mead	WPB	4564	---	---	30	28	4/23	---	---
WPB-881	WPB	3979	62.4	52.6	29	28	4/21	96	15.4
Crown	WWW	4968	60.1	45.6	32	35	4/22	100	14.0
Duraking	WWW	5126	61.6	36.2	29	15	4/23	97	12.9
Platinum	WWW	3658	59.7	34.4	27	15	4/24	100	15.3
Q-Max	WWW	4790	62.7	41.5	32	30	4/22	98	13.7
YU806-93	WPB	4718	63.1	46.3	28	38	4/22	98	15.4
D2472	WWW	5103	61.2	42.2	32	55	4/22	100	13.0
D5384-2-1-1	WWW	3986	60.5	38.7	27	85	4/24	97	13.8
D8270-4	WWW	5035	63.6	45.2	30	48	4/22	98	14.7
UT0712	WWW	4896	61.5	49.1	30	45	4/22	100	14.2
CP-1	APB	5075	63.7	51.9	34	58	4/23	99	13.6
D1-2	APB	3604	61.2	58.9	27	5	4/24	97	17.2
IM-1	APB	5124	65.0	49.7	30	63	4/24	99	12.4
Maestrale	Allstar	4467	63.5	51.4	31	53	4/22	100	14.9
Saragolla	Allstar	5136	64.2	46.7	30	63	4/21	98	14.2
Avg.	---	4607	62.1	45.5	29	45	4/22	99	14.4
<u>Wheat</u>									
Yecora Rojo	UC	4722	60.3	33.6	27	23	4/21	97	14.0
Joaquin	WPB	5712	63.1	36.8	33	13	4/18	98	13.0
BR2306	WWW	5176	62.9	42.3	36	55	4/21	98	15.6
BR3677	WWW	4304	62.0	42.5	35	58	4/23	98	13.7
CNBR9302	WWW	5014	62.4	38.3	35	65	4/26	99	13.1
NM-1	APB	4201	58.7	37.7	34	83	4/26	99	12.4
MC-1	APB	3846	57.9	33.5	29	65	4/27	96	13.4
W9-3AL	APB	3566	59.0	37.1	30	63	4/28	100	14.9
Avg.	---	4616	61.2	39.9	32	54	4/24	98	13.8

^a Grain yield: LSD (5%) = 856 lbs/acre and cv = 13.2% for durum and wheat, which were grown in the same experiment.

Table 10. Durum variety yield results from **Coolidge (WWW)**, 2012.

Entry	Source	Grain yield ^a	Test weight	Seed weight	Plant height	Maturity	HVAC	Grain protein
		lbs/acre	lbs/bu	mg	inches	%	%	%
				<u>Durum</u>				
Helios	APB	5094	62.8	46.6	34	5/08	100	13.1
Kronos	APB	5027	62.5	49.7	34	5/07	100	13.7
Sky	APB	4157	61.9	45.8	32	5/11	99	13.5
Westmore	APB	5860	61.7	44.3	34	5/10	100	14.4
Havasus	WPB	4999	63.3	51.9	34	5/08	99	13.9
Orita	WPB	4496	62.1	54.2	34	5/09	100	15.0
WB-Mead	WPB	5625	61.8	45.4	38	5/13	100	14.7
WPB-881	WPB	4382	61.6	49.8	32	5/11	100	14.8
Crown	WWW	4685	60.6	50.9	36	5/16	100	13.6
Duraking	WWW	5794	63.5	44.7	30	5/13	100	13.6
Platinum	WWW	4268	62.1	41.5	30	5/13	100	12.7
Q-Max	WWW	5573	61.1	49.6	36	5/16	99	12.8
YU806-93	WPB	5094	62.5	49.9	32	5/09	100	13.3
D2472	WWW	5153	60.9	48.0	34	5/14	99	13.7
D5384-2-1-1	WWW	5676	61.2	40.0	32	5/12	100	13.7
D8270-4	WWW	4708	63.3	45.6	34	5/15	100	12.6
UT0712	WWW	4315	63.0	57.9	34	5/09	99	13.3
CP-1	APB	5369	63.7	47.5	36	5/14	99	12.4
D1-2	APB	4020	61.6	56.3	34	5/14	100	14.9
IM-1	APB	5982	64.1	46.7	32	5/13	99	12.4
Avg.	---	5032	62.3	48.3	34	5/12	100	13.6

^a Grain yield: LSD (5%) = 856 lbs/acre and cv = 13.2% for durum.

Table 11. Summary of barley, durum, and wheat variety yield results for 2012 from four locations.

Table 11. Summary of barley, durum, and wheat variety yield results for 2012 from four locations.							
Entry	Source	Grain yield (% of location average)				Mean	Standard Deviation
		AZ City (APB)	Maricopa (UA)	Yuma (WPB)	Coolidge (WWW)		
<u>Barley</u>							
Baretta	APB	116	98	96	97	102	10
Kopious	APB	111	98	123	96	107	13
Chico	WPB	103	101	113	100	104	6
Cochise	WPB	104	74	117	96	98	18
Gustoe	WPB	99	108	91	107	101	8
Nebula	WPB	93	102	132	96	106	18
Commander	WWW	95	97	93	105	97	5
Max	WWW	84	115	104	113	104	14
BA4513	WWW	120	114	76	122	108	22
NZBA2724	WWW	81	102	66	98	87	16
SW2614	WWW	96	85	93	99	93	6
<u>Durum</u>							
Helios	APB	105	107	119	101	108	8
Kronos	APB	93	108	90	100	98	8
Sky	APB	93	94	100	83	93	7
Westmore	APB	104	97	89	117	102	12
Havasus	WPB	95	102	94	99	98	4
Orita	WPB	104	106	97	89	99	7
WB-Mead	WPB	98	101	99	112	102	6
WPB-881	WPB	93	100	86	87	92	6
Crown	WWW	105	84	108	93	97	11
Duraking	WWW	95	107	111	115	107	9
Platinum	WWW	79	79	79	85	81	3
Q-Max	WWW	111	103	104	111	107	4
YU806-93	WPB	96	105	102	101	101	4
D2472	WWW	105	91	111	102	102	9
D5384-2-1-1	WWW	106	111	87	113	104	12
D8270-4	WWW	93	79	109	94	94	12
UT0712	WWW	93	103	106	86	97	9
CP-1	APB	121	109	110	107	112	6
D1-2	APB	87	99	78	80	86	10
IM-1	APB	123	117	111	119	118	5
Maestrale	Allstar	---	92	97	---	94	4
Saragolla	Allstar	---	91	112	---	101	14
<u>Wheat</u>							
Yecora Rojo	UC	100	92	102	---	98	5
Joaquin	WPB	104	107	124	---	112	11
BR2306	WWW	91	94	112	---	99	11
BR3677	WWW	90	79	93	---	87	8
CNBR9302	WWW	96	94	109	---	100	8
NM-1	APB	115	128	91	---	111	19
MC-1	APB	115	101	83	---	100	16
W9-3AL	APB	98	106	77	---	94	15