

Research Report

Small Grains Variety Evaluation at Maricopa, 2016

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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/az1265-2016.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. Variety trials on agricultural experimental stations 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/az1265-2016.pdf>.

Procedure

Barley and durum varieties were evaluated at Maricopa by the University of Arizona. The field was fallow the previous year and the soil texture is a sandy loam. Soil chemical properties from a sample taken before planting are listed in Table 1. Mono-ammonium phosphate (11-52-0) was applied preplant at a rate of 100 lb fertilizer/acre providing 11 lb N/acre and 52 lb P₂O₅/acre. The seed was planted in 30 ft x 800 ft strips separated by a 7.5 ft border in benches 1-4 of Field 32E. The seed was planted with a Great Plains grain drill with 7.5 inch spacing between rows. The seeding rate was approximately 150 lbs/acre for durum varieties and 120 lbs/acre for barley varieties. The experimental design was a randomized complete block with 4 replications, and 5 barley and 10 durum varieties. Growing conditions are listed in Table 2. The following data was collected: grain yield, test weight, seed weight, plant height, lodging, heading, physiological maturity, grain protein, and HVAC (durum only). Grain was harvested with a commercial combine 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 6.25 for barley and 5.7 for durum 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, Dunn = Dunn Grain Company, HSG = Highland Specialty Grains, and SNR = Second Nature Research.

Discussion

Yield and plant characteristics of the varieties are presented in Table 3. This year was characterized by a warm winter but a cool spring. 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/az1265-2015.pdf>.

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Table 1. Soil chemical analysis preplant for a small grain variety trial at the Maricopa Ag Center, 2016.

Chemical measurement	Unit	Value	Unit	Value
Total Exchange Capacity	(meq/100 g)	24.88	---	---
pH	(pH)	8.4	---	---
Organic Matter	(%)	1.03	---	---
Estimated Nitrogen Release	(lb N/acre)	41	---	---
NO ₃ -N	(ppm)	67.6	---	---
NH ₄ -N	(ppm)	4.1	---	---
S	(mg/kg)	44	---	---
P	(mg/kg)	8	---	---
Ca	(mg/kg)	3786	(%)	76.09
Mg	(mg/kg)	272	(%)	9.11
K	(mg/kg)	517	(%)	5.33
Na	(mg/kg)	370	(%)	6.47
Fe	(mg/kg)	4	---	---
Mn	(mg/kg)	9	---	---
Cu	(mg/kg)	2.16	---	---
Zn	(mg/kg)	0.59	---	---

Table 2. Cultural practices for a small grains variety trial at the Maricopa Ag Center, 2016

Cultural information	Maricopa
Previous crop	Fallow
Soil texture	Sandy loam
Planting date	12/09/15
Irrigation dates and amounts	<u>Date</u> <u>Inches</u>
	12/09 4.80
	2/05 3.57
	2/29 3.61
	3/14 3.54
	3/29 4.14
	4/12 4.18
	<u>5/01 5.82</u>
Sum 29.66	
Nitrogen dates and rate (of UAN 32 except 11-52-0 on 12/09))	<u>Date</u> <u>lb N/A</u>
	12/09 11
	2/05 54
	2/29 53
	3/14 50
	3/29 25
	4/12 25
	<u>5/01 0</u>
Sum 218	
Phosphorus (date, lbs P ₂ O ₅ /a, fertilizer)	12/09/15: 52 lbs P ₂ O ₅ /a as 11-52-0
Pesticides (date)	None
Harvest date	6/16

Table 3. Barley and durum variety yield results from the Maricopa Ag Center, 2016

Entry	Source	Grain yield ^a lb/acre	Test weight lb/bu	Seed weight mg	Plant height inches	Lodg- ing %	Head- ing	Flower- ing	Matur- ity	HVAC %	Grain protein %
<u>Barley</u>											
Baretta	APB	6622	49.8	44.2	25	23	3/29	3/31	5/06	.	12.0
Chico	HSG	6553	49.9	34.3	26	10	4/01	4/03	5/08	.	11.5
Cochise	HSG	6308	49.3	38.3	30	23	3/18	3/20	4/25	.	12.1
Kopious	APB	6571	50.7	42.4	26	5	3/22	3/23	4/25	.	11.7
Nebula	HSG	6246	50.9	48.5	27	3	3/26	3/28	5/05	.	12.7
Avg		6460	50.1	41.5	27	13	3/25	3/27	5/01	.	12.0
CV (%)		9.2	2.7	5.9	.	164	.	.	.	.	5.2
LSD _{.05}		ns	ns	3.8	.	ns	.	.	.	.	ns
<u>Durum</u>											
Duraking	Dunn	6041	61.9	41.9	35	0	3/27	4/03	5/06	99	14.3
Havasu	SNR	6229	61.7	46.6	36	3	3/26	4/02	5/06	100	14.5
Helios	APB	6453	63.1	46.1	37	3	3/18	3/24	5/06	100	13.5
Kronos	APB	6430	61.3	51.1	32	23	3/22	3/28	5/05	100	13.7
Orita	SNR	6321	60.8	52.2	36	0	3/26	4/02	5/06	100	15.6
Platinum	Dunn	6417	60.5	39.5	29	3	3/27	4/02	5/05	100	14.5
Tiburón	APB	6477	60.7	53.0	33	0	3/26	4/02	5/06	99	14.5
WB-Mead	SNR	5975	59.7	41.0	34	3	3/27	4/02	5/08	100	15.4
WB-Mohave	SNR	6449	61.3	44.5	36	0	3/27	4/02	5/06	100	14.6
Westmore HP	APB	6100	59.7	37.8	32	38	3/23	3/30	5/03	100	15.5
Avg		6289	61.1	45.4	34	7	3/24	3/31	5/05	100	14.6
CV (%)		9.0	2.1	6.4	.	215	.	.	.	0.3	3.5
LSD _{.05}		ns	1.9	4.2	.	22	.	.	.	0.4	0.8