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Small Grains Variety Testing in Plant Breeders Nurseries, 2017

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Summary

Small grain varieties are evaluated each year by University of Arizona personnel in cooperation with the plant breeding companies in the state. 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/az1265-2017.pdf .

Introduction

Small grain varieties were tested as part of the on-going effort to assess variety productivity and characteristics. Barley and durum commercial cultivars were tested. The purpose of these tests is to characterize varieties in terms of yield potential and other characteristics. Variety trials on agricultural experimental stations or in plant breeder nurseries 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 online at http://ag.arizona.edu/pubs/crops/az1265-2017.pdf .

Procedure

Barley varieties were evaluated at the following locations: Arizona City by Arizona Plant Breeders, Gila Valley by Dunn Grain, and Maricopa and Willcox by Highland Specialty Grains. Durum varieties were evaluated at the following locations: Gila Valley by Dunn Grain and Somerton and Gadsden by Second Nature Research. The durum trial in Arizona City by Arizona Plant Breeders was not reported due misidentification of seed at planting time. The seed was planted in 20 ft rows with a cone planter in seven rows spaced 6 inches apart. The seeding rate was approximately 120 lbs/acre for durum varieties and 100 lbs/acre for barley varieties. The experimental design was a randomized complete block with 4 replications, and 13 durum and 5 barley entries. Growing conditions at each site are listed in Table 1. The following data was collected, but not all data was collected for all crops at all locations: grain yield, test weight, plant height, lodging, and heading. 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. Abbreviations for the sources of varieties are: APB = Arizona Plant Breeders, Dunn = Dunn Grain Company, Inc., HSG = Highland Specialty Grains, and SNR = Second Nature Research.

Discussion

Yield and plant characteristics of the varieties are presented in Tables 2 and 3 and summaries of yield are presented in Tables 4 and 5. 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/az1265-2017.pdf .

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Table 1. Cultural practices for the small grains variety trials at the various locations. The locations at Maricopa and Willcox were for barley only and conducted by HSG, the previous crop was corn, and the planting dates were 11/23/16 for Maricopa and 2/10/17 for Willcox.

Cultural information	Arizona City (APB)	Gila Valley (Dunn)	Gadsden (SNR)	Somerton (SNR)
Previous crop	Cotton	Produce	Lettuce	Lettuce
Soil texture	Sandy clay loam	Sandy clay loam	Clay loam	Clay loam
Planting date	12/20-21/16	2/10/17	12/23/16	1/12/17
Irrigation dates (amount)	Rainfall germ 12/22 (1) 1/6 (6) 2/12 (6) 3/8 (6) 3/30 (6) 4/18 (6) 5/1 (6) Total = 36 in.	2/11 (6 in.) 3/13 (6 in.) 4/03 (6 in.) 4/28 (6 in.) 5/15 (6 in.) Total = 28 in.	12/23 (sprinkler) 2/02 (flood) 3/09 (flood) 3/20 (flood) 4/01 (flood) 4/20 (flood)	12/23 (sprinkler) 2/02 (flood) 3/03 (flood) 3/25 (flood) 4/01 (flood) 4/21 (flood)
Nitrogen dates (lbs N/acre, fertilizer)	12/10: 22 as 11-52-0 12/12: 150 as 46-0-0 2/12: 34 as 46-0-0 3/8: 38 as 46-0-0 3/30: 40 as 46-0-0 4/18: 40 as 46-0-0 Total = 314 lbs N/A	3/17: 46 as 46-0-0 Total = 46 lbs N/a	Total=270 lbs N/a	Total=265 lbs N/a
Phosphorus (date, lbs P_2O_5/a, fertilizer)	12/10: 104 as 11-52-0	N/A	N/A	N/A
Pesticides (date)	Axial (2/23)	Buctril (2/23) Raptor (2/23)	N/A	N/A
Harvest date	6/5	6/10	---	---

Table 2. Barley grain yield and other characteristics of varieties tested by plant breeding companies at various locations.

Company	Location	Variety	Source	Grain yield	Test weight	Plant height	Lodging	Heading
				lb/A	lb/bu	inches	%	date
APB	Arizona City	Baretta	APB	5583	47.7	---	---	---
		Kopious	HSG	5998	48.5	---	---	---
		Chico	HSG	4682	46.5	---	---	---
		Cochise	APB	5745	47.2	---	---	---
		Nebula	HSG	5102	48.1	---	---	---
		Avg		5422	47.6	---	---	---
		$LSD_{.05}$		1333	---	---	---	---
		CV (%)		16.4	---	---	---	---
Dunn	Gila Valley	Baretta	APB	6492	---	24	10	4/14
		Kopious	HSG	6378	---	26	0	4/07
		Chico	HSG	5481	---	25	1	4/16
		Cochise	APB	5971	---	28	3	4/03
		Nebula	HSG	5755	---	26	1	4/11
		Avg		6047	---	26	3	4/10
		$LSD_{.05}$		561	---	---	---	---
		CV (%)		5.9	---	---	---	---
HSG	Maricopa	Baretta	APB	6554	49.0	34	33	---
		Kopious	HSG	6851	49.0	33	15	---
		Chico	HSG	6554	47.5	31	18	---
		Cochise	APB	7227	48.0	31	10	---
		Nebula	HSG	5960	46.7	41	25	---
		Avg		6629	48.0	34	20	
		$LSD_{.05}$		1174	---	---	---	---
		CV (%)		11.5	---	---	---	---
HSG	Willcox	Baretta	APB	6910	45.0	25	---	---
		Kopious	HSG	6593	46.3	22	---	---
		Chico	HSG	6178	43.0	20	---	---
		Cochise	APB	8534	46.7	22	---	---
		Nebula	HSG	6534	42.9	26	---	---
		Avg		6950	44.8	23	---	---
		$LSD_{.05}$		811	---	---	---	---
		CV (%)		7.6	---	---	---	---

Table 3. Durum grain yield and other characteristics of varieties tested by plant breeding companies at various locations.

Company	Location	Variety	Source	Grain yield	Plant height	Lodging	Heading
				lb/A	inches	%	date
Dunn	GilaValley	APB335	APB	5023	28	4	4/10
		Helios	APB	5106	33	0	4/04
		Kronos	APB	4279	30	13	4/10
		Tiburon	APB	5775	32	0	4/12
		Westmore HP	APB	5141	31	11	4/09
		Candura	Dunn	5764	32	0	4/10
		Duraking	Dunn	6180	30	4	4/12
		Platinum	Dunn	5458	29	0	4/12
		Topper	Dunn	6255	31	1	4/16
		Havasu	SNR	5184	33	3	4/11
		Orita	SNR	5499	34	5	4/12
		WB-Mead	SNR	5818	32	1	4/12
		WB-Mohave	SNR	4922	33	3	4/12
		Avg		5416	31	3	4/11
		$LSD_{.05}$		607	---	---	---
		CV (%)		7.8	---	---	---
SNR	Somerton	APB335	APB	6125	27	---	3/31
		Helios	APB	6072	30	---	3/23
		Kronos	APB	6072	31	---	3/26
		Tiburon	APB	6415	31	---	4/01
		Westmore HP	APB	5755	30	---	3/27
		Candura	Dunn	5834	29	---	4/02
		Duraking	Dunn	6389	31	---	4/01
		Platinum	Dunn	5993	29	---	4/01
		Topper	Dunn	5861	35	---	4/08
		Havasu	SNR	4990	30	---	3/30
		Orita	SNR	5702	31	---	4/07
		WB-Mead	SNR	6310	34	---	4/10
		WB-Mohave	SNR	5676	28	---	3/31
		Avg		5938	30	---	4/01
		$LSD_{.05}$		499	---	---	---
		CV (%)		5.0	---	---	---

Table 3 (cont'd). Durum grain yield and other characteristics of varieties tested by plant breeding companies at various locations.

Company	Location	Variety	Source	Grain yield	Plant height	Lodging	Heading
				lb/A	inches	%	date
SNR	Gadsden	APB335	APB	6419	28	---	3/24
		Helios	APB	5858	32	---	3/15
		Kronos	APB	5471	30	---	3/17
		Tiburon	APB	6109	33	---	3/24
		Westmore HP	APB	5819	32	---	3/22
		Candura	Dunn	6399	32	---	3/26
		Duraking	Dunn	6341	33	---	3/25
		Platinum	Dunn	6361	31	---	3/29
		Topper	Dunn	6709	35	---	3/30
		Havasu	SNR	5375	32	---	3/17
		Orita	SNR	5993	34	---	3/30
		WB-Mead	SNR	7076	37	---	3/31
		WB-Mohave	SNR	5877	29	---	3/21
		Avg		6139	32	---	3/24
		$LSD_{.05}$		609	---	---	---
		CV (%)		5.9	---	---	---

Table 4. Summary of barley variety yield results for 2017 from four locations.

		Grain yield (% of location average)					
Entry	Source	Arizona City (APB)	Gila Valley (Dunn)	Maricopa (HSG)	Willcox (HSG)	Mean	Standard Deviation
Baretta	APB	103	107	99	99	102	4
Kopious	HSG	111	105	103	95	104	7
Chico	HSG	86	91	99	89	91	5
Cochise	APB	106	99	109	123	109	10
Nebula	HSG	94	95	90	94	93	2

Table 5. Summary of durum variety yield results for 2017 from three locations.

		Grain yield (% of location average)				
Entry	Source	AZ City (APB)	Somerton (SNR)	Gadsden (SNR)	Mean	Standard Deviation
APB335	APB	93	103	105	100	6
Helios	APB	94	102	95	97	4
Kronos	APB	79	102	89	90	12
Tiburon	APB	107	108	100	105	5
Westmore HP	APB	95	97	95	96	1
Candura	Dunn	106	98	104	103	4
Duraking	Dunn	114	108	103	108	5
Platinum	Dunn	101	101	104	102	2
Topper	Dunn	115	99	109	108	8
Havasu	SNR	96	84	88	89	6
Orita	SNR	102	96	98	98	3
WB-Mead	SNR	107	106	115	110	5
WB-Mohave	SNR	91	96	96	94	3