Summary of 1986 Wheat and Barley Variety Trials in Yuma, Poston, and the Mohave Valley

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Wheat and barley varieties need to be evaluated at several locations for several years to form a basis for variety recommendations. Erroneous conclusions may be drawn from a single variety trial since the relative performance of varieties may be influenced by cultural practices and environmental conditions.

Small grains variety trials were initiated in the 1985-1986 growing seasons in Yuma, Poston, and the Mohave Valley as part of the ongoing effort to evaluate variety performance (see previous three articles in this volume). Identical entries were planted at all three locations in order to evaluate differences in results over locations in a given year. The results were summarized by expressing test weight, protein, and yield as a percent of the mean in each location and performing a combined analysis of variance over locations.

BARLEY

Performance of barley cultivars at the various locations is presented in Table 1. Test weight was highest for Westbred Gustoe, followed by Columbia and Westbred Gus, and lowest for Westbred Barcott. Westbred Gustoe was consistently a top-yielder in all the tests. Westbred Barcott maintained yields slightly above average, despite being a short season variety; it would certainly serve well in a double cropping situation.

Table 1. Performance of barley cultivars over locations

Cultivar	Location	Test Weight	Yield
		-----% of mean-----	
Westbred Barcott	Yuma	95 d*	105 b
	Poston	94 d	102 bc
	Mohave Valley	91 d	95 def
Columbia	Yuma	99 c	92 ef
	Poston	100 bc	90 f
	Mohave Valley	104 ab	99 cd
Westbred Gus	Yuma	100 c	99 cd
	Poston	100 bc	96 de
	Mohave Valley	100 bc	99 cd
Westbred Gustoe	Yuma	107 a	104 bc
	Poston	105 a	112 a
	Mohave Valley	105 a	107 ab
Westbred Barcott	---	93 c	101 b
Columbia	---	101 b	94 c
Westbred Gus	---	100 b	98 b
Westbred Gustoe	---	106 a	108 a

* Means within a column followed by the same letter are not significantly different according to FLSD.05

DURUM WHEAT

The summary for durum wheat performance at the various locations is presented in Table 2. Yavaros and Gem had high test weights. The low test weight of Westbred Turbo, when averaged over locations, is misleading because of the low value obtained in Yuma. Protein was highest for Westbred 881, as expected. The protein content of Westbred Turbo, a new variety, was lower than desired in these tests. However, grain quality involves other factors in addition to protein content, so general conclusions should not be made at this time.

We were not able to detect differences in yield when summarized over locations. However, some unusual results included the below-average performance of Aldura in the Mohave Valley, the above-average yields of Westbred 881 in Yuma, and the below- average yields of Westbred Turbo in Yuma.

Table 2. Performance of durum wheat cultivars over locations

Cultivar	Location	Test Weight	Protein	Yield
			---------% of mean---------	
Aldura	Yuma	104 ab*	102 c	103 a
	Poston	100 bcde	100 c	102 a
	Mohave Valley	97 de	102 c	85 a
Westbred	Yuma	105 a	99 cd	105 a
881	Poston	96 e	113 a	81 a
	Mohave Valley	97 de	107 b	95 a
Gem	Yuma	103 ab	-	108 a
	Poston	103 abc	96 de	102 a
	Mohave Valley	103 ab	96 def	111 a
Westbred	Yuma	89 f	93 f	83 a
Turbo	Poston	100 abcde	95 ef	109 a
	Mohave Valley	98 cde	102 c	103 a
Yavaros	Yuma	103 abc	99 cde	102 a
	Poston	101 abcd	95 def	108 a
	Mohave Valley	104 ab	94 f	106 a
Aldura	---	100 ab	101 b	97 a
Westbred 881	---	100 b	109 a	94 a
Gem	---	103 a	96 c	106 a
Westbred Turbo	---	95 c	97 c	97 a
Yavaros	---	103 a	95 c	105 a

* Means within a column followed by the same letter are not significantly different according to FLSD.05

BREAD WHEAT

Bread wheat performance at various locations is presented in Table 3. No differences in test weight were detected among varieties. Yecora Rojo led in protein content. We were not able to find differences in yield when summarized for the various locations. The results indicate that Probrand 775 can be high-yielding, but the protein content obtained was low. Yecora Rojo, by contrast, is medium-yielding, but has a high protein content.

Table 3. Performance of bread wheat cultivars over locations

Cultivar	*Location*	*Test Weight*	*Protein*	*Yield*
			----------% of mean---------	
Westbred	Yuma	99 a*	105 ab	98 a
911	Poston	99 a	97 ef	100 a
	Mohave Valley	100 a	99 cde	96 a
Probrand	Yuma	101 a	93 g	113 a
775	Poston	98 a	97 efg	98 a
	Mohave Valley	99 a	97 def	107 a
Probred	Yuma	99 a	99 cde	99 a
	Poston	100 a	99 cdef	101 a
	Mohave Valley	100 a	102 bc	98 a
Topaz	Yuma	101 a	102 bc	93 a
	Poston	-	-	-
	Mohave Valley	100 a	95 fg	97 a
Yecora	Yuma	100 a	101 bcd	97 a
Rojo	Poston	102 a	106 a	101 a
	Mohave Valley	102 a	106 a	102 a
Westbred 911	---	100 a	99 b	98 a
Probrand 775	---	99 a	96 c	106 a
Probred	---	100 a	100 b	99 a
Topaz	---	100 a	97 c	95 a
Yecora Rojo	---	101 a	105 a	100 a

* Means within a column followed by the same letter are not significantly different according to FLSD.05

Relative variety performance is difficult or impossible to test objectively. Each variety has different cultural and environmental requirements for optimum performance, yet all varieties are treated equally in a variety trial. Certain varieties will be favored over others by the cultural practices imposed. We can only conclude from a trial which varieties performed best in that particular location, management system, and year. The conditions under which each variety will perform best are known to a certain extent, but we can not always explain the relative yields obtained in individual tests. Results accumulated over locations and years are presently required to effectively evaluate a variety.