Barley Variety Trial on the Safford Agricultural Center, 1997

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Abstract

Sixteen varieties of barley were tested at the Safford Agricultural Center in 1997. Nebula, a new variety from Western Plant Breeders, was the highest yielding variety in the trial with a yield over 5100 pounds per acre. Nebula also had the highest bushel weight of the varieties tested.

Introduction

Because of the Karnal bunt problem in the state, very little wheat was grown in the county in 1997. This made barley the small grain of choice for the Safford valley. Barley has a greater potential as an alternative crop in Graham county than wheat, because it is more salt tolerant (1) and many of the fields and wells in the county have moderate salt problems. Small grain prices have been low the past several years and thus few acres are currently being grown in the county. It is important, however, to test barley varieties every few years to see if new materials have been introduced that will benefit those who do grow the crop. At the higher elevations in the county, rust and other diseases have been occurring under center pivot irrigation. Research needs to be done to evaluate disease resistance in available barley varieties under disease pressure situations.

Methods and Materials

Sixteen varieties of barley were obtained from the breeders and seed companies that have an interest in barley being grown in Arizona. Most of these same varieties were grown by Mike Ottman on the Maricopa Agricultural Center. A small plot, replicated field trial was developed for the comparison of these varieties. Plots were planted using a John Deere Van Brunt grain drill, seeding in 6 inch rows. The following crop history indicates the important features of the study.

Crop History:

Previous crop: Cotton
Soil type: Pima clay loam variant
Planting date: 20 December 1996 Seeding rate: Approximately 150 lbs/ac
Fertilizer: 200 lbs/ac of 16-20-0 broadcast pre-plant, 150 lbs/ac urea on 10 February and 130 lbs/ac urea on 13 March
Herbicide: 2-4,D applied on April 23 to control mustard
Insecticide: None
Irrigation: Furrow, watered up and 9 irrigations applied at 45% soil water depletion (approximately 37 acre in)Rainfall: 2.4 inches
Plot size: 4 rows (12 feet) wide by 210 feet long
Harvest date: 23 June 1997
Heat Units (40/81°F): From planting to 1 June (maturity) = 2874

The plots were harvested using a Gleaner Model L combine, catching the grain from each plot in a 5 gallon bucket in the grain bin. These buckets were weighed using a hanging scale and samples were taken to determine moisture and bushel weight.

Results and Discussion

The yield results are found in Table 1. Nebula, a new variety developed for the California market with special emphasis placed on disease resistance, was the highest yielding variety in the trial with a yield over 2.5 tons per acre. This variety has been tested in University trials in Maricopa and Gila Bend (2, 3, 4, 5) as experimental variety DA 592-47. In the Ottman studies, Nebula rated first in a field of eighteen in 1996 and tenth in a field of eighteen in 1995 and in the Jech, et.al., studies it rated third in a field of fifteen in 1996 and fourth in a field of eighteen in 1995. This information together with the information in this study indicate that Nebula is a strong variety and should be evaluated further in the southeastern region in the state. Max and BA 8017, the top yielding variety in our studies in 1995 (6) came in toward the bottom of this trial. Bushel weights are close to the national averages, but lower than seen in the sited works 2 - 6. Nebula had the highest bushel weight in the study with PH 593-106 and Max following close behind. Using the percent moisture of seed at harvest as an indicator of maturity of the cultivar, one can deduce that varieties B91-3, PH 593-106 and BA 8076 are slightly earlier in maturity and that BA 8963 and BA 8017 are slightly later in maturity that the rest of the varieties. The actual seeding rate varied somewhat from the 150 pounds per acre that was targeted. The variances are felt to be due to differences in seed shape and density from the variety that was used to calibrate the grain drill. To see what effect density (1000 kernel weight) had on the planting rate, actual seeding rates were plotted against 1000 kernel weights. This chart is found in figure 1. The regression curve drawn through the data points indicates that there is a trend toward higher seeding rates with the heavier seed, but scatter from the curve indicates that seed shape is probably the dominant factor. The average weight per 1000 kernels is 38.5 grams, which compares favorably with the national standard of 33.6 grams.

References

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Acknowledgments

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Table 1. Yields and other agronomic characteristics of barley varieties grown on the Safford Agricultural Center, 1997.

Variety	Source	Yield @ 12% Moisture (lbs/ac)	Percent of Gustoe Yield	Bushel Weight (lbs)	Percent Moisture	Actual Seeding Rate (lbs/ac)	1000 Kernel Weight (gms)
Nebula	WPB	5104 a	114%	49.5 a	8.3 abc	129	41.7 a
BA 8076	WWW	5047 ab	112%	46.0 b	7.8 bc	102	38.7 cde
BA 8055	WWW	4798 ab	107%	47.4 ab	8.2 abc	114	39.9 bcd
B91-3	APB	4786 ab	107%	48.5 ab	7.4 c	153	38.2 de
BA 7139	WWW	4629 ab	103%	48.8 ab	8.7 abc	120	39.8 bcd
BA 7032	WWW	4508 ab	100%	48.0 ab	8.6 abc	144	41.2 abc
BA 7128	WWW	4505 ab	100%	48.1 ab	8.3 abc	112	38.0 de
Gustoe	WPB	4489 ab	100%	48.3 ab	9.1 abc	126	38.6 cde
B91-BR	APB	4415 ab	98%	47.8 ab	8.4 abc	144	36.2 ef
Barcott	WPB	4329 ab	96%	46.0 b	8.9 abc	--	35.0 f
PH 593-106	WPB	4176 abc	93%	49.4 a	7.7 bc	--	30.6 g
BA 8017	WWW	4164 abc	93%	48.0 ab	10.4 a	--	37.0 def
Max	WWW	4071 abc	91%	49.3 a	8.6 abc	135	41.2 abc
BA 2391	WWW	3993 bc	89%	48.3 ab	8.7 abc	127	39.2 bcd
Mucho	APB	3221 cd	72%	48.8 ab	9.3 abc	137	43.5 a
BA 8963	WWW	2973 d	66%	47.7 ab	10.0 a	115	37.0 def
Mean		4325.5	--	48.1	8.6	127.5	38.5
LSD(05)		918.6	--	2.4	1.9	--	2.6
CV(%)		14.9	--	3.6	15.7	--	4.7

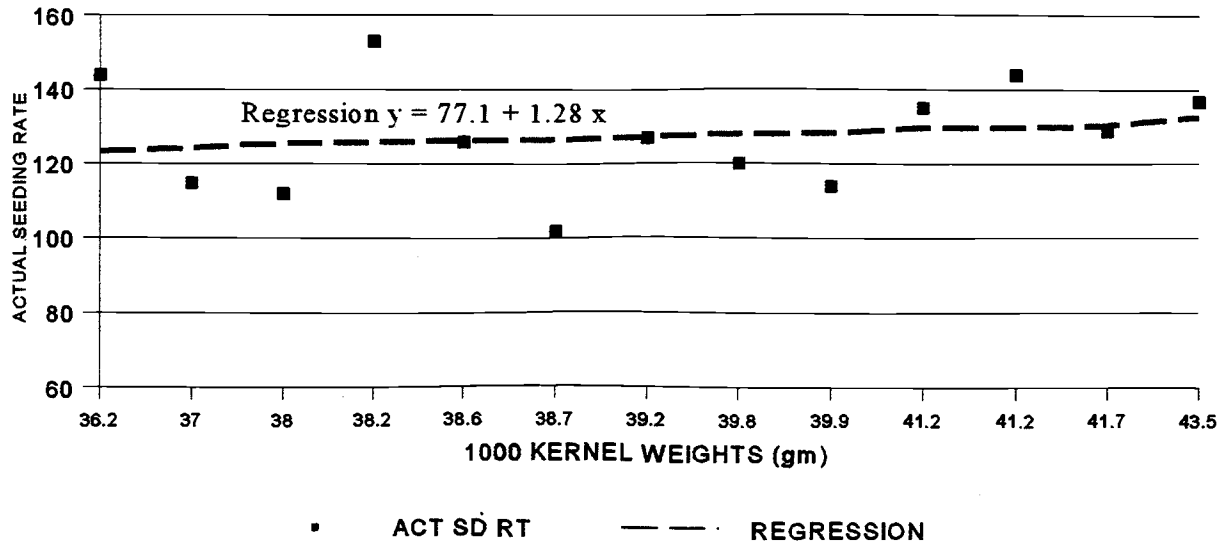

Figure 1. Actual seeding rates plotted against 1000 kernel weights, Safford Ag Center, 1997.