

National Dry Bean Nursery Trials in Bonita, 1999

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Abstract

This report contains the results of the 1999 National Cooperative Dry Bean Nursery Trials. This replicated, small plot trial contains thirty nine varieties of ten different classes of beans. Buster, a pinto variety was the highest yielding variety in the study with a yield over 3700 pounds per acre. Yields, percent moisture, aerial biomass, harvest index, seeds per pound, and plant populations are reported for this study.

Introduction

Currently prices are depressed in beans as well as most other crops grown in the high desert of southeastern Arizona, but beans remain a good rotation crop in Cochise County. Large profits are not possible, but at least this crop adds fertility and good tilth characteristics to the soil that are beneficial to subsequent crops. This study is to help the bean growers in the high desert areas of the state and also to supply valuable information to the bean industry in the United States and Canada. These plots are grown in cooperation with the National Cooperative Dry Bean Nurseries which have test sites in 20 locations in the United States and 4 locations in Canada.

Materials and Methods

This study was a replicated small plot study planted within a 125 acre pivot on the Haas Farm in the Bonita area of southern part of Graham county in southeastern Arizona. The plots were planted dry with a John Deere 71 flex-planter modified to accept cone-drop hoppers. After planting the plots were watered up using a center pivot irrigation system. The cultural practices for the plots were the same as the rest of the pivot and are highlighted below.

Crop History:

Soil type: Tubac sandy loam/sandy clay loam complex

Previous crop: Corn

Planting date: July 9, 1999 Rate: 6 seeds per foot (~105K seeds per acre)

Herbicide: Treflan chemigated at watering up

Fertilizer: 190 lbs/ac 11-52-0 + 9 gal 10-34-0 + Zn at planting,
25 lbs/ac N applied via fertigation

Irrigation: Center pivot

Harvest date: October 14th (97 days, 1762 HU(86/55°F))

The small replicated bean plots were cut together with the rest of the bean field and then a subsample was taken for harvest. Plants from each plot were counted, weighed, threshed with a Vogel-type small plot thresher and bean weights and aerial biomass determined.

Results and Discussion

Different classes of beans are reported together in the table with varieties sorted by yield within classes. The average yield, across all varieties, was higher in 1999 than in 1998 (1), but still considerably lower than in 1997 (2). There seems to be a strong correlation between yields and planting date, with the earlier planted plots yielding higher. Heat units received during the growing season, however, seemed to have little effect on the yield. See Table 1 and Figure 1.

Table 2 gives some agronomic and physiological parameters for bean varieties grown in the 1999 regional bean nursery. The yields are in pounds per acre and seeds per pound are self-explanatory, but some of the other terms need explanation. **Aerial Biomass** is the weight of the entire plant above the roots, at physiological maturity, in pounds per acre. **Harvest Index** is the dry bean yield divided by the aerial biomass, and is a measure of the plants ability to partition it's energies to seed production.

The highest yielding variety in the trial was Buster, a pinto bean variety produced by Seminis Vegetable Seeds. With a yield nearly 500 pounds higher than the next highest pinto variety, slightly lower percent moisture (implying earlier maturity), high harvest index, low numbers of seeds per pound (meaning large seeds), this variety bears further scrutiny in this area. AC Calmont, the highest yielding variety in 1998, had a more modest yield in 1999. In fact, all the Dark Red Kidney varieties produced modestly. Small Red and Great Northern varieties produced yields higher than 3000 pounds per acre, indicating that these classes of beans could be economically produced in the area if there were a market for them.

References

1. Clark, L.J. and E.W. Carpenter. 1999. National Dry Bean Nursery Summary, 1998. Forage and Grain, A College of Agriculture Report, The University of Arizona, Tucson, AZ. Series P-118, pp. 129-133.
2. Clark, L.J. and E.W. Carpenter. 1998. National Dry Bean Nursery Summary, 1997. Forage and Grain, A College of Agriculture Report, The University of Arizona, Tucson, AZ. Series P-114, pp. 146-148.

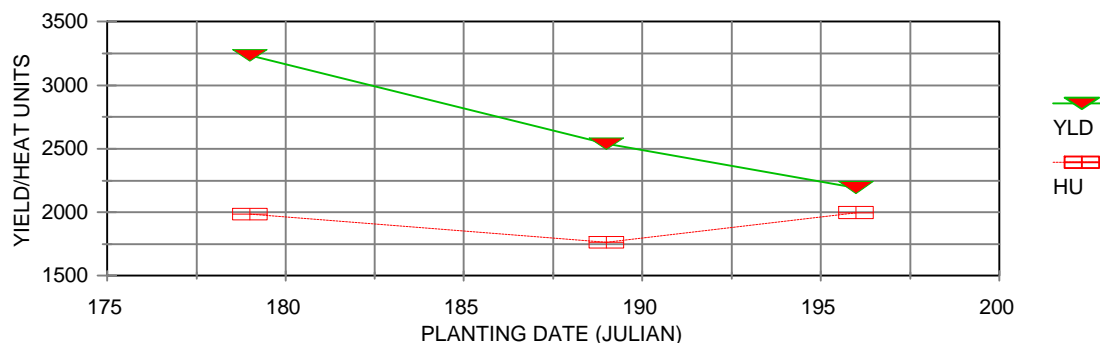


Figure 1. Plots of Yield and Heat Units by date of planting for bean variety trials from 1997 to 1999 in the high desert area of southeastern Arizona.

Table 1. Summary of yields, planting dates and heat units over the last three years of the study.

Year	Yield	Planting Date (Julian day)	Heat Units (86/55°F)
1997	3236	6/27 (179)	1985
1998	2195	7/14 (196)	1999
1999	2539	7/9 (189)	1762

Table 2. Results of the National Cooperative Dry Bean Nursery in Bonita, Arizona, 1999.

Variety	Source	Bean Yield @ 10% Moisture	Percent Moisture	Aerial Biomass	Harvest Index	Seeds/lb	Plants/acre
Black							
ICB 10-5	USDA WA	2663	10.7 a-f	5690.0 b	43.5 i-m	1982 d	84942 a-g
Shiny Crow	CSU	2422	11.1 a-d	4682.7 bcd	49.8 d-j	1971 d	82220 a-h
19606-6	USDA WA	2345	9.5 e-k	4647.3 bcd	32.7 n	2034 d	64796 f-i
Midnight	Cornell	1483	12.0 a	5036.6 bcd	33.8 mn	2517 a	84398 a-h
Small White							
Mackinac	MSU	2726	9.6 e-k	5935.1 ab	47.5 e-k	2289 bc	81675 a-h
ND91-117-05	NDSU	2226	9.6 e-k	4437.7 bcd	47.5e-k	2390 ab	54450 i
ISB 1814	ID Sd Bn	2153	9.0 ijk	4546.6 bcd	47.4 e-k	2086 cd	81675 a-h
ND91-076-01	NDSU	1981	9.4 f-k	5254.4 bcd	39.4 k-m	2508 a	81675 a-h
Vista	Gentec	1932	9.7 e-k	5091.1 bcd	39.7 k-m	2419 ab	101277 a
ISB 1256	ID Sd Bn	1851	10.1 c-j	5091.1 bcd	38.5 k-n	2443 ab	76230 c-i
AC Compass	AgCanada	1709	9.5 e-k	4737.2 bcd	37.3 lm	1951 d	81675 a-h
Great Northern							
Weihing	UNeb	3066	11.3 abc	5200.0 bcd	51.7 c-j	1163 f-j	77319 c-h
Matterhorn	MWU	2716	9.8 d-k	5445.0 bc	51.0 d-j	1117 g-j	77319 c-h
US 1140	UI/USDA	2674	9.8 d-k	4764.4 bcd	57.6 bcd	1140 f-j	75141 c-i
UI 465	UI/USDA	2306	8.7 k	4247.1 bcd	55.3 b-f	1054 h-k	69696 d-i
Pink							
L94C356	AgCanada	2826	9.6 e-k	4601.0 bcd	62.6 ab	1208 f-i	83309 a-h
Viva	UI/USDA	2751	10.0 c-k	5254.4 bcd	54.3 b-h	1616 e	83309 a-h
Pinto							
Buster	Seminis	3746	9.6 e-k	5172.8 bcd	61.3 abc	1065 hij	70785 d-i
Vision		3277	10.3 b-i	7650.2 a	45.8 f-l	1089 hij	100733 ab
Chase	UNeb	3102	10.1 c-j	5417.8 bc	59.4 bcd	1323 f	84398 a-h
Bill-Z		3101	10.1 c-j	5472.2 bc	42.2 j-n	1168 f-j	89298 a-e
Mesa	CSU	3070	9.8 d-k	4410.5 bcd	56.9 b-e	1167 f-j	67518 d-i
92235	USask	3062	9.8 d-k	5254.4 bcd	59.2 bcd	1034 ijk	89843 a-d
AC Pintoba	AgCanada	2975	9.9 d-k	4873.3 bcd	54.6 b-g	1093 hij	63162 ghi
Kodiak	MSU	2836	9.5 e-k	4791.6 bcd	52.0 c-i	1089 hij	82764 a-h
ISB 5893	ID Sd Bn	2578	10.1 c-j	4682.7 bcd	57.4 bcd	1079 hij	79497 a-h
UI 320	UI	2563	10.8 a-e	4247.1 bcd	62.3 ab	1018 i-l	70241 d-i
Elizabeth	Fox Bn Co	2421	10.3 b-h	4247.1 bcd	58.7 bcd	1005 j-m	75686 c-i
Red							
NW 63	UI/USDA	3398	10.4 b-h	5118.3 bcd	54.0 b-h	1253 fgh	75686 c-i
UI 259	UI	2863	11.5 ab	5826.2 ab	52.0 c-i	1302 fg	87120 a-f
Dark Red Kidney							
AC Calmont	AgCanada	2143	9.3 g-k	4383.2 bcd	50.3 d-j	769 no	66974 e-i
Montcalm	MSU	1824	9.9 d-k	4900.5 bcd	38.9 k-m	805mno	86031 a-f
Red Hawk	MSU	1528	8.8 jk	3457.6 d	44.9 g-l	853k-n	72419 d-i
Light Red Kidney							
CELERK	UC Davis	2873	9.4 f-k	5363.3 bc	54.2 b-h	672 no	80586 a-h
Chinook 2000	MSU	1639	9.7 e-k	3838.7 cd	44.8 h-l	830 l-o	63162 ghi
White Kidney							
WSWA-70	USDA WA	2702	9.4 f-k	5744.5 b	43.3 i-m	634 o	83853 a-h
Beluga	MSU	2140	10.0 d-k	5009.4 bcd	44.7 h-l	819 l-o	95288 abc
Lassen	Sac Val Mil	2051	9.2 h-k	3675.4 cd	42.7 i-m	742 no	62073 hi
Yellow							
Enola		2757	10.3 b-h	5771.7 b	51.0 d-j	1066 hij	87665 a-e
	Mean	2539.4	9.9	4966.3	48.8	1368.8	78857.2
	LSD(05)	707.1	1.3	1847.3	9.7	203.2	22645
	CV(%)	19.9	9.4	26.6	14	10.6	20.5