

# 2003 Cooperative Dry Bean Nursery

L.J. Clark, K.F. Ellsworth and E.R. Norton

## Abstract

*This report contains the results of the 2003 National Cooperative Dry Bean Nursery Trials grown at two different sites in southeastern Arizona. These replicated, small plot trials contained twenty-eight varieties from ten different classes of beans. Bill-Z, a pinto variety, was the highest yielding variety in the Terry Brother's trial with a yield over 3800 pounds per acre. K124467, a Flor de Mayo variety from Archer-Daniels-Midland, was the highest yielding variety in the Haas trial with a yield just under 2900 pounds per acre. Yields, aerial biomass, harvest index, and 100 bean weights are reported for all varieties in both studies.*

## Introduction

Beans are a good rotation crop in Cochise County. Large profits are not possible, but 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. An interesting sidelight to the study is that the cooperators are able to look at non-pinto varieties as a potential option for bean growers in the area. And, while the pinto varieties have dominated the high yield category for the past 4 years, the most money could be produced by growing a mix of the bean varieties and selling a '7-bean' soup mix.

## Materials and Methods

These studies were replicated small plot trials planted within 125 acre pivots on the Haas Farm in the Bonita area of southern part of Graham County and the Terry Farm in Kansas Settlement in Cochise 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:** Location: Haas Farm, Bonita, Graham County, AZ

Elevation: 4300 feet

Previous crop: Corn

Soil type: Tubac sandy loam/sandy clay loam complex

Fertilizer: None

Herbicide: Treflan and Eptam chemigated at watering up

Design: Randomized complete block design 2 rows per plot 30 inch row spacing 25 foot row length

Planting date: 3 July 2003 Plant population: 120 seeds were planted in 20 ft. plots (~105 plants/ac)

Insecticide: None

Fungicide: 2 applications of Topsin to control white mold

Irrigation system: Center pivot

Harvesting system: Threshed with a vogel type thresher, 40 square feet harvested

Harvesting date: 13 October

Climatic data: Average temperature during growing season - 75.6°F, Heat Units 86/55°F = 2042 (102 days)

**Crop History:** Location: Terry Brothers Farm, Kansas Settlement, Cochise County, AZ  
Elevation: 4200 feet  
Previous crop: Corn  
Soil type: Pima loam  
Fertilizer: 90 pounds of nitrogen per acre chemigated  
Herbicide: Treflan and Eptam chemigated at watering up, Raptor as a rescue treatment during the season  
Design: Randomized complete block design 2 rows per plot 30 inch row spacing 25 foot row length  
Planting date: 11 July 2003 Plant population: 120 seeds were planted in 20 ft. plots (~105 plants/ac)  
Insecticide: Pyrethroid applied to control worms  
Fungicide: None  
Irrigation system: Center pivot  
Harvesting system: Threshed with a vogel type thresher, 40 square feet harvested  
Harvesting date: 24 October  
Climatic data: Average temperature during growing season - 75.6°F, Heat Units 86/55°F = 1999 (105 days)

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 weighed and 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 and across both trials was about 150 pounds per acre higher than the last years average (1), and the quality was good. The two trials differed considerably from soil type to micro climate to inputs and the average yields were more than 1000 pounds per acre apart.

Table 1 gives some agronomic and physiological parameters for bean varieties grown on the Haas Farm in the 2003 regional bean nursery. The yields are in pounds per acre and 100 bean weight in grams, 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 its energies to seed production.

The highest yielding variety in this trial was K124467, a Flor de Mayo bean variety, produced by Archer-Daniels-Midland (ADM). Othello was the highest yielding pinto bean variety, and was the third highest yielding variety in the study. White mold was a factor in the bean crop this year and all yields were suppressed. USPT-73, the highest yielding pinto variety the year before was 400 pounds behind the leader. This might suggest that USPT-73 is more susceptible to white mold infections. USDA-27, a small white bean with black spots, which we affectionately called the "Holstein bean" produced a yield just lower than the K124467. Both of these bean varieties could be economically grown in the area if niche markets could be developed.

Table 2 contains data for the trial grown on the Terry Brothers Farm in Kansas Settlement. Bill-Z, the long time standard for the area produced the highest yield at 3820 pounds per acre. Matterhorn, UC Pink 9634 and UC Flor 9623 were the next highest producing varieties with yields over 3700 pounds per acre.

Beans remain a good rotation crop for the non-salty, high desert areas in southeastern Arizona. The insects, diseases and weeds that affect them are distinct from other crops in the rotation, so this is a plus. White mold is a disease that has been increasing in the area in recent years and is a concern. Changing the irrigation cycle to allow drying between waterings is currently being explored as well as fungicide and plant growth regulator use.

## References

1. Clark, L.J. and E.W. Carpenter. 2003. National Dry Bean Nursery Summary, 2002. Forage and Grain, A College of Agriculture Report, The University of Arizona, Tucson, AZ. Series P-135, pp. 74-76.

**Table 1. Yields, Seed Weight, Biomass and Harvest Index (Seed Yld/Biomass Yld) and for Dry Bean Variety Trial Grown in Bonita, 2003.**

Variety	Type	Source	Bean Yield (lbs/ac)	100 Seed Weight (g)	Biomass Yield (lbs/ac)	Harvest Index
UC BTS 96114	Black	UC	2370	20	6126	39
115M	Black	MSU	2344	21	6044	38
UI-911	Black	UI	2333	19	5636	41
ISB BTR-26	Black	ISB	2047	22	5146	40
Seahawk	Sm Wht	MSU	2426	23	5636	43
Frigate	Sm Wht		2295	21	5608	41
CPC00125	Sm Wht	CPC	2271	32	5826	38
Comet	Sm Wht	ISB	1783	27	5391	31
Matterhorn	Grt Northern	MSU	2006	33	4683	43
ISB-4071	Grt Northern	ISB	1865	34	4274	44
Othello	Pinto		2463	39	5527	47
USPT-CBB-1	Pinto	USDA WA	2343	38	5173	45
ISB-1194-2	Pinto	ISB	2339	41	5581	42
Maverick	Pinto	NDSU	2172	41	4792	45
Bill-Z	Pinto		2119	36	4792	44
USPT-73	Pinto	WSU/ARS	2073	41	4873	43
Burke	Pinto	USDA WA	2022	38	4738	43
PR95-055-2-1-16	Pink	USDA WA	2284	34	5336	42
Roza	Pink		2022	34	5192	39
UC Pink 9634	Pink	UC	1943	33	4982	38
Merlot	Sm Red	USDA MI	1945	38	4873	40
LeBaron	Sm Red	USDA WA	1574	35	3784	41
Cardinal	Cranberry		1206	52	3566	34
CPC99814	Cranberry	CPC	769	51	2723	28
K124467	Flor de Mayo	ADM	2885	39	6071	48
UC Flor 9623	Flor de Mayo	UC	2394	36	5083	47
CPC00153	Yellow	CPC	1166	36	3920	30
USWA-27	Ana	USDA WA	2834	31	6044	47
		AVG	2082	33	5040	41
		LSD	619	3	1047	7
		CV	21	6	15	13

**Table 2. Yields, Seed Weight, Biomass and Harvest Index (Seed Yld/Biomass Yld) and for Dry Bean Variety Trial Grown in Kansas Settlement, 2003.**

Variety	Type	Source	Bean Yield (lbs/ac)	100 Seed Weight (g)	Biomass Yield (lbs/ac)	Harvest Index
ISB BTR-26	Black	ISB	3170	16	10482	30
UI-911	Black	UI	3017	17	8358	36
115M	Black	MSU	2902	17	8521	34
UC BTS 96114	Black	UC	2725	16	8685	32
Seahawk	Sm Wht	MSU	3646	17	8630	43
CPC00125	Sm Wht	CPC	2776	26	8249	34
Frigate	Sm Wht		2652	17	9175	30
Comet	Sm Wht	ISB	2461	27	6616	37
Matterhorn	Grt Northern	MSU	3783	30	8113	47
ISB-4071	Grt Northern	ISB	3181	33	6289	50
Bill-Z	Pinto		3820	33	8086	47
USPT-73	Pinto	WSU/ARS	3632	37	7187	51
Othello	Pinto		3630	35	7677	46
USPT-CBB-1	Pinto	USDA WA	3540	34	9148	39
Burke	Pinto	USDA WA	3477	34	7296	47
Maverick	Pinto	NDSU	3331	35	8794	38
ISB-1194-2	Pinto	ISB	2756	36	6752	41
UC Pink 9634	Pink	UC	3768	32	9583	39
PR95-055-2-1-16	Pink	USDA WA	3665	34	10427	37
Roza	Pink		3060	32	7351	41
LeBaron	Sm Red	USDA WA	3003	33	6725	44
Merlot	Sm Red	USDA MI	2932	31	7977	37
Cardinal	Cranberry		2902	55	9229	32
CPC99814	Cranberry	CPC	2131	61	6343	34
UC Flor 9623	Flor de Mayo	UC	3725	33	8249	45
K124467	Flor de Mayo	ADM	3008	30	7133	42
CPC00153	Yellow	CPC	2877	34	12088	21
Canario 707	Yellow		2702	41	10019	27
USWA-27	Ana	USDA WA	2555	25	9175	29
Mixture	Drk Rd Kidney		3534	52	8522	41
		AVG	3132	32	8363	38
		LSD	1037	4	2245	8
		CV	24	9	19	16