Dry Bean Performance

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Abstract

Several market classes of dry beans (*Phaseolus vulgaris*) were planted in an observational trial at the Klamath Experiment Station (KES) in 2000 to determine whether this crop could be grown to maturity in the cool, short-season climate of the Klamath Basin. Black, Red Mexican, Pinto, Great Northern, and Pink market classes were evaluated. Yields varied widely across replications due to border affects in the small plot area. Maximum yields of approximately 3,500 lb/acre are comparable to yields from commercial fields in Idaho.

Introduction

Crop options for the Klamath Basin are limited by climatic conditions, a lack of processing facilities, and distance to markets. Low commodity prices for several crops that are grown in the region and the loss of sugarbeet acreage because of closure of processing facilities in Northern California have heightened interest in finding alternative crops that offer profit potential. The Central Oregon region has evaluated dry beans in recent years, leading to small-scale commercial production in 2000. Dry beans were chosen for evaluation in the Klamath Basin because market outlets are readily accessible and variable production costs are much lower than for row crops currently grown in the region.

Procedures

Eight dry bean varieties were planted on Poe fine sandy loam soil fallowed the previous 2 years. The soil has an organic matter content of about 1.0 percent in the plow layer and a pH of about 6.5. Field preparation occurred in May. A Kincaid (Kincaid Equipment Manufacturing) plot planter was used to apply 50 lb/acre of N, P_2O_5, and K_2O and to open seed furrows on May 22. Seed was hand-planted at a depth of 0.5 in at 4 seeds/ft in 24-in rows on May 23. Individual plots were 3 rows, 15 ft long. Plots were arranged in a randomized complete block design with four replications.

Weeds were controlled by hand cultivation on June 7, June 19, and June 26. White mold, a common fungal pathogen in dry bean production, was not observed. No fungicides or insecticides were applied. Irrigation, totaling 13 in for the season, was applied with solid-set sprinklers arranged in a 40- by 48-ft pattern. Bean foliage was protected from frost damage on June 11 and July 4 with sprinkler irrigation. Irrigation ceased on August 15 to provide adequate time for seed drying.

All plants in the center row of each plot were harvested by hand on September 8 and stored in burlap bags until the beans were threshed on October 3. Seed was cleaned using a bench-top seed cleaner. Seed weight was recorded and moisture content was determined on a subsample. Moisture content was less than 6 percent for all varieties. Yield data were not adjusted for moisture content or broken or cracked seed. All data were statistically analyzed using MSU STAT software.

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Results and Discussion

Poor growth uniformity occurred because of shading from a nearby windbreak. Plants at the southern end of the trial had good emergence and vigor throughout the season. Emergence and vigor declined steadily to the shaded north end of the experimental area. Plants at the northern end were stressed throughout the season, which led to early flowering and maturity and low yield.

Yields did not significantly differ between varieties (Table 1). Averaged across replications, yields were very low. Yield differences between replications were significant for each variety. A three-fold difference in yield between high and low-yielding replications was observed in several varieties. Using data from single replications in the southern portion of the trial, yields averaged approximately 3,500 lb/acre. Yields in this range are common for commercial dry bean crops in the Pacific Northwest. The best performance was observed for the pink variety, 85312 and the black variety, Black Shadow. Another pink variety, UI537, and the Great Northern variety, 658 produced the lowest yields averaged over replications. The red varieties, Ember and Garnett, matured about 10 days earlier than Black Shadow.

Summary

The main objective of the study was to determine if dry beans could reach physiological maturity in the cool, short-season climate of the Klamath Basin. All varieties reached maturity within 100 days after planting. Under optimum growing conditions, early-maturing varieties could be grown in the Klamath Basin. Frequent frosts during the growing season are common occurrences. Frost protection in this trial was satisfactory at minimum temperatures of 31^0F on June 11 and 32^0F on July 4. Duration of both frosts was short and little water was applied. Under more severe frost conditions, bean stems may not withstand the weight of ice build-up over extended time periods. Additional research is needed to determine economic potential and plant response to frost protection with sprinklers.

Table 1. Yield of eight dry bean varieties planted May 23, 2000 at KES, Klamath Falls, OR.

Variety or selection	Type	% stand	Population plants / acre	Physiological Maturity (DAP)[1]	Harvest (DAP)[1]	Yield	Best rep yield
						-------- lb / acre --------	
Black Shadow	Black	83	72,300	98	108	920	3,600
658	G. North	73	63,600	92	108	470	3,860
UI 537	Pink	83	72,300	90	108	480	2,090
85312	Pink	85	74,100	94	108	910	4,320
Winchester	Pinto	68	59,200	90	108	780	3,680
Agassiz	Pinto	79	68,800	92	108	800	3,240
Ember	Red	90	78,400	87	108	640	3,960
Garnett	Red	87	75,800	89	108	710	3,400
Mean		81	70,600	92	108	710	3,520
CV (%)		-----	-----	-----	-----	50	-----
LSD (.05)		-----	-----	-----	-----	NS	-----

[1]DAP = days after planting.