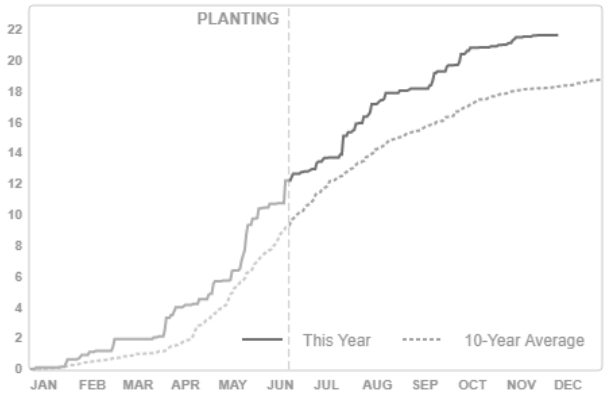
Dry Bean Row Spacing and Population for Direct Harvest

Study ID: 601161201701
County: Sheridan
Soil Type: Johnstown loam 0-2% slope; Keith loam gravelly substratum, 1-3% slope
Planting Date: 6/15/17
Harvest Date: 10/24/17
Variety: Sinaloa pinto beans
Reps: 5
Previous Crop: Oats
Tillage: Field cultivator and vertical tillage 3 times
Herbicides: ***Pre:*** 32 oz/ac Prowl® and 14 oz/ac Outlook® on 6/17/17
Post: 21 oz/ac Varisto® (Raptor® and Basagran®) and 8 oz/ac Basagran® on 7/17/17
Seed Treatment: None
Foliar Insecticides: None
Foliar Fungicides: 32 oz/ac Sanidate on 9/1/17

Fertilizer: 25 lb/ac N, 25 lb/ac P, 10 lb/ac S, 1 lb/ac Zn, and 2 lb/ac Mn spread on 6/13/17
Irrigation: Pivot, Total: 10"
Rainfall (in):



Introduction: The purpose of this study was to compare dry edible beans (Sinaloa variety) planted in 30" rows with a target population of 90,000 plants per acre with beans drilled in 7.5" rows with a target population of 120,000 plants per acre. These are two common planting scenarios for growers in western Nebraska. The two planting treatments were evaluated in a direct harvest bean production system looking at yield, harvest loss, pod height, and other agronomic characteristics.

The treatments were replicated five times in plots 700 feet by 40 feet (0.64 acres). The plots were planted in a randomized complete block design on June 15. The drilled treatments went in with a Landoll 5531 drill. The 30" row treatment went in with a White model 8824 with Precision Plant seed meters.

The plots were harvested on October 24 using a John Deere S690 with a MacDon 40 foot flex draper. To evaluate harvest weight, beans were weighed at the scales at Kelley Bean, Mirage Flats. Samples from each plot were analyzed for bean quality parameters. Pod height measurements were taken on Oct. 11 to determine the percent of pods 2" or greater above the soil surface. Harvest loss estimates were determined by taking counts in 12 one-square-foot frames randomly chosen in the harvested area but equally representing left side of header, center of header, and right side of the header area behind the combine.

Results:

	Early Season Stand Count	Pods >2" above ground (%)	Harvest Loss (bu/ac)	Split (%)	Small (%)	Moisture (%)	Density (lb/bu)	Seeds per lb	Yield (bu/ac) †	Marginal Net Return‡ ($/ac)
7.5" row spacing, 120,000 plants/ac	106,564 A*	88 A	3.9 B	1.8 A	11.5 A	12.1 A	61.1 A	1,506 A	40 A	483.93 A
30" row spacing, 90,000 plants/ac	68,093 B	76 B	5.8 A	2.4 A	8.3 A	12.1 A	60.7 A	1,476 A	40 A	515.38 A
P-Value	0.0001	0.001	0.012	0.218	0.237	0.950	0.375	0.308	0.942	0.201

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre corrected to 14% moisture and is adjusted for clean yield (% splits, % small, and % foreign material removed).
‡Marginal net return based on $24/cwt ($14.40/bu at 60lb/bu).

Summary:

1) Stand counts were lower than target populations for both the 90,000 and 120,000 target.
2) 88 percent of the pods in the 7.5" row spacing and 120,000 plants/acre treatment were 2" or more above the soil as compared with 76 percent in the 30" row spacing and 90,000 plant/acre treatment. This is consistent with the results of this study in 2016 where 95 percent of the pods in the 7.5" row spacing and 120,000 plants/acre treatment were 2" or more above the soil as compared with 91.6 percent in the 30" row spacing and 90,000 plants/acre treatment. A late harvest with dried bean plants remaining in the field contributed to lower than usual pod heights.
3) Harvest loss was significantly higher in the 30" row spacing and 90,000 plants/acre treatment, probably due to pod height. This is also consistent with results in 2016.
4) There was no difference in percent splits, percent small beans, moisture, seed density, seeds per lb, or yield between the two treatments.

Sponsored by: University of Nebraska Lincoln; Nebraska CornBoard

In Partnership with: Nebraska Soybean Checkoff; Nebraska Corn Growers Association; Nebraska Dry Bean Commission