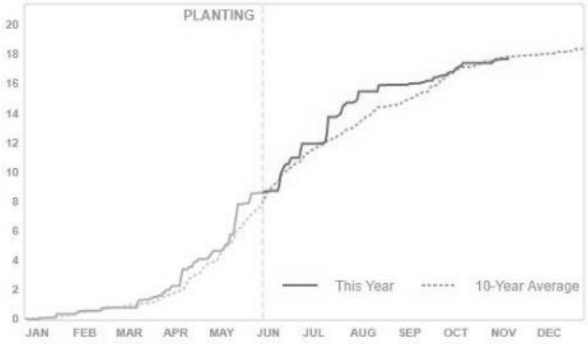
Pinto Bean Planting Population for Direct Harvested Dry Beans

Study ID: 0809013201801
County: Box Butte
Soil Type: Alliance loam 0-1% slope; Alliance loam 1-3% slope
Planting Date: 6/5/18
Harvest Date: 9/24/18
Row Spacing (in): 20
Variety: Radiant pinto bean
Reps: 4
Previous Crop: Sugarbeets
Tillage: Vertical tillage, rolled field after planting, rotary hoe after planting
Herbicides: ***Pre:*** 2 pt/ac Prowl®, 14 oz/ac Outlook®, and 22 oz/ac Roundup PowerMAX® ***Post:*** 21 oz/ac Varisto™, 8 oz/ac Basagran®, and 7 oz/ac Outlook® on 6/30/18; desiccation with 2 oz/ac Sharpen® and 2 pts/ac Gramoxone® on 9/12/18
Seed Treatment: Dynasty®, Maxim®, Apron®, Vibrance®, Cruiser®
Foliar Insecticides: None
Foliar Fungicides: 12 oz/ac Approach® for white mold on 7/20/18, 2 pts/ac Champ® for common and Halo blight on 7/30/18, and 2 pts/ac Champ® for blight on 8/7/18
Fertilizer: 8 gal/ac 10-34-0, 2 gal/ac Thio-sul® (12-0-0-26S), and 1 gal/ac Awaken (16-0-2) coulter applied; 2 gal/ac 10-34-0 and 4 gal/ac Riser® in furrow; 1 gal/ac Awaken (16-0-2) with fungicide on 7/20/18
Irrigation: Pivot, Total: 8.3”
Rainfall (in):



Introduction: The purpose of this study was to compare several planting rates of dry edible beans (Radiant variety pinto) planted in 20" row spacing. Target populations were 90,000, 110,000, and 130,000 plants/ac, however the planting equipment used resulted in seeding rates which differed from the intended rate. Actual populations determined by early-season stand counts were 72,075, 91,237, and 112,740 plants/ac. Seeding rates were estimated to be 10% greater at 79,200, 100,100, and 124,300 seeds/ac, respectively; these rates were used to calculate seed costs. The plots were direct harvested on September 24, with a John Deere S680 combine with a 35' MacDon® FD-75 flex draper header. The temperature at harvest was 69°F, and 45% relative humidity. Hot and dry weather conditions at harvest generally result in greater harvest loss through pod shattering. Yield was evaluated using the combine yield monitor. Samples from each plot were analyzed for bean quality parameters. Pod height measurements were taken to determine the percent of pods 2" or greater above the soil surface. Harvest loss estimates were determined by taking counts in 9 one-square-foot frames randomly chosen in the harvested area but equally representing the left side of header, center of header, and right side of header area behind the combine.

Results:

Treatment (seeds/ac)	Stand Count (plants/ac)	Pods >2" above ground (%)	Harvest Loss (bu/ac)	Small (%)	Split (%)	Foreign Matter (%)	Damaged (%)	Moisture (%)	Density (lb/bu)	Seeds per lb	Yield† (bu/ac)	Marginal Net Return‡ ($/ac)
90,000	72,075 C*	80 B	3.2 A	0.8 A	1.2 A	0.5 A	0.6 A	10.2 A	61 A	1,258 A	38 A	432.60 A
110,000	91,237 B	82 B	3.5 A	0.9 A	1.3 A	0.4 A	0.7 A	10.4 A	60 A	1,238 A	38 A	417.38 A
130,000	112,740 A	85 A	3.0 A	1.2 A	1.4 A	0.3 A	0.6 A	10.3 A	61 A	1,276 A	39 A	417.34 A
P-Value	<0.0001	0.012	0.684	0.436	0.761	0.600	0.702	0.185	0.337	0.281	0.922	0.952

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre corrected to 14% moisture and adjusted for clean yield (% splits, % small, and % foreign material removed).
‡Marginal net return based on $22/cwt ($13.20/bu at 60 lb/bu). Seed cost for the Radiant pinto bean seed was $79/100,000 seeds. Seed costs for each treatment were: $62.57/ac for 79,200 seeds/ac, $79.08/ac for 100,100 seeds/ac, and $98.20/ac for 124,300 seeds/ac.

Summary:

- There were a number of negative things that affected population, plant health, and yield, including compaction from wet beet harvest the year before, heavy rains resulting in crusting at emergence, and wet conditions leading to root disease early and throughout the year. Because of these challenges, actual stand counts were less than the targeted populations for all three treatments.
- The percent of pods greater than 2" above the soil was greater for the 130,000 seeds/ac than for the 100,000 seeds/ac and 90,000 seeds/ac treatments. For the 130,000 seeds/ac treatment, 85% of the pods were greater than 2" above the ground compared to only 82% for the 110,000 seeds/ac treatment and 80% for the 90,000 seeds/ac treatment.
- There was no significant difference in harvest loss, percent splits, percent small beans, percent foreign material, percent moisture, density, seeds per lb, and percent damage for the three treatments tested.
- There was no significant difference in yield and net return among the three populations tested.

Sponsored by: University of Nebraska Lincoln

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