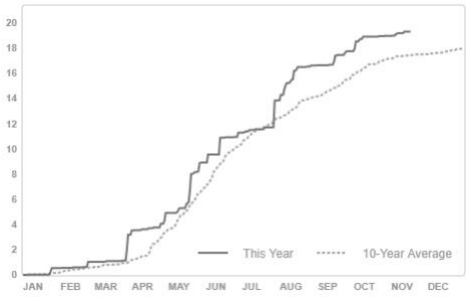
Dry Bean Direct Harvest Variety Study

Study ID: 152013201701
County: Box Butte
Soil Type: Keith loam
Planting Date: 6/7/17
Harvest Date: 10/16/17
Population: 120,000 target
Row Spacing (in): 15
Reps: 4
Previous Crop: Corn
Tillage: Double disked and rolled before planting
Herbicides: ***Pre:*** 30 oz/ac Roundup®, 30 oz/ac Prowl®, and 15 oz/ac Outlook® on 6/8/17
Post: 4 oz/ac Raptor®, 30 oz/ac Basagran®, and 10 oz/ac Select® on 7/5/17; Desiccant/harvest aid: 32 oz/ac Gramoxone®, 2 oz/ac Sharpen®, and 1% crop oil on 9/17/17.

Seed Treatment: Apron XL®, Maxim®, Rancona®, Dynasty®
Foliar Insecticides: None
Foliar Fungicides: 4 oz/ac Priaxor®, 0.75 lb/ac Nu-Cop® HB on 8/6/17
Fertilizer: 50 lb/ac N
Irrigation: Pivot, Total: 10"
Rainfall (in):



Introduction: The purpose of this study was to compare four different Pinto bean varieties in a direct harvest bean production system looking at both yield and harvest loss. Currently, most dry beans in western Nebraska are harvested in a two-step process starting with a cutting windrowing operation, and then combining. Direct harvest is simply one pass through the field with the combine. A good upright bean variety, proper level field conditions and a combine header suitable for direct harvest are essential to minimize harvest loss and economically justify direct harvest.

This study evaluated four Pinto bean varieties all suitable for direct harvest. The varieties Monterrey, Radiant, Vibrant, and ND Palamino were replicated four times in plots 555 feet by 30 feet. The plots were planted in a randomized complete block design with a Case IH 5400 Soybean Drill. Stand counts were taken early in the season. The plots were fertilized, sprinkler irrigated, and treated identically. Low hanging pods are a major cause of harvest loss in the direct harvest process; therefore, pod height measurements were taken to determine the percent of pods greater than 2" above the ground just before harvest. The varieties Radiant, Vibrant, and ND Palamino are all new slow darkening Pinto varieties that are currently desired by industry.

The plots were harvested on October 16 using a Case IH 7088 combine equipped with a MacDon FD70, 30 foot flex draper head. The center 30 feet of the 40 foot plot was harvested. The beans from each plot were weighed using a Par-Kan weigh wagon with a Weigh-Tronix scale. Nine square-foot counts along the plot area were taken the day of harvest to estimate harvest loss during combining. A sample of beans was taken from each plot and analyzed for quality by Kelley Bean Company in Scottsbluff. All bean samples graded USDA #1, and the moistures were between 12.5 and 14.6 percent.

Results:

	Early Season Stand Count (plants/ac)	Pods >2" above ground (%)	Harvest Loss (bu/ac)	Small (%)	Moisture (%)	Density (lb/bu)	Seeds per lb	Yield (bu/ acre)†	Marginal Net Return‡ ($/ac)
Monterrey	84,705 AB*	79 A	5.6 B	0.6 A	13.3 A	59 A	1,275 A	52 AB	668.61 AB
Radiant	72,023 C	73 B	4.5 BC	0.3 A	13.3 A	59 A	1,230 AB	52 AB	687.17 AB
Vibrant	90,804 A	78 AB	3.8 C	0.4 A	13.2 A	58 A	1,208 B	57 A	740.90 A
ND Palamino	74,928 BC	59 C	7.9 A	0.6 A	13.3 A	56 B	1,238 AB	49 B	639.90 B
P-Value	0.002	<0.0001	0.0002	0.380	0.987	0.085	0.085	0.037	0.063

*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 $24/cwt ($14.40/bu at 60lb/bu). Seed cost was the same for all varieties planted; however, seed size varies, such that the same drill setting results in different seeding rates. To account for this, seed costs are adjusted for actual stands. Radiant cost $61.78/ac, Vibrant cost $78.00/ac, Monterrey cost $72.93/ac, and ND Palomino cost $64.35/ac

Summary:

- Moisture and percent of small seeds were the same between varieties tested.
- Stand counts are significantly different between varieties due to seed size and seed movement through the drill. Adjustments to the drill were not made between varieties. More studies are needed to evaluate the relationship between seeding rate and yield. Dry beans have the capacity to compensate under reduced plant stands.
- There was a significant difference in pod height between the varieties. Monterrey and Vibrant had a greater percent of pods above 2". ND Palomino had the least amount of pods above 2". Overall, the pod heights were lower than desired for direct harvest due to delayed harvest.
- Harvest loss was also significantly different between the varieties, ranging from 3.8 to 8 bu/ac. Vibrant and Radiant had lower harvest loss. ND Palomino had the greatest amount of harvest loss primarily due to low pod height.
- ND Palomino had significantly less dense seed than the other varieties tested.
- Yield and marginal net return were significantly different between varieties. Vibrant had a significantly higher yield and net return than ND Palomino. There was no statistical yield or net return difference between Vibrant, Radiant, and Monterrey.

Sponsored by: University of Nebraska Lincoln; Nebraska Corn Board

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