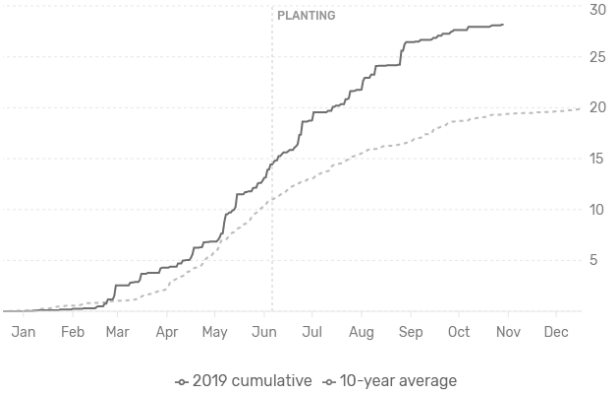
# Pinto Varieties for Direct Harvest

**Study ID:** 0608013201901
**County:** Box Butte
**Soil Type:** Keith loam, 0-1% slope; Busher-Jayem loamy very fine sands, 0-3% slope
**Planting Date:** 6/20/19
**Harvest Date:** 10/17/19
**Seeding Rate:** 110,000
**Row Spacing (in):** 7.5
**Reps:** 4
**Previous Crop:** Corn
**Tillage:** Vertical-Till, chisel, and two packings
**Herbicides:** ***Pre:*** 14 oz/ac Outlook® on 6/13/19; 32 oz/ac glyphosate with 13 oz/ac crop oil on 6/19/19 ***Post:*** 26.5 oz/ac Basagran®, 4 oz/ac Raptor®, and 8 oz/ac Targa® with 26.5 oz/ac Prime crop oil on 7/19/19
**Seed Treatment:** Maxim®, Apron XL®, Rancona®, Dynasty®, Cruiser®
**Foliar Fungicides:** 4.9 oz/ac Priaxor®, 16 oz/ac Badge® SC, and 2 oz/ac PREV-AM® Ultra (aerially applied with 3 gal/ac carrier)

**Fertilizer:** 45 lb N/ac, 40 lb P/ac, 7 lb S/ac, 2 lb Zn/ac dry spread; 32 oz/ac 32% UAN with pre-herbicide on 6/19/19; 20 lb N/ac and 2 lb S/ac by chemigation in July; 32 oz/ac 32% UAN with post-herbicide on 7/19/19
**Irrigation:** Pivot, Total: 7"
**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.

The study evaluated Gleam, Radiant, Lumen, and Palomino. The study was planted with a 40-foot John Deere® 1990 air drill in 7.5" spacing. The target population for the study was 110,000 plants per acre. Because of the inaccuracy of drills, normally as a result of seed size and seed flow through the machine, actual plant populations determined by early season stand counts were 85,601 plants/ac for Gleam, 70,136 plants/ac for Radiant, 67,740 plants/ac for Lumen, and 68,829 plants/ac for Palomino. Planting populations were assumed to be 10% greater at approximately 94,161 seeds/ac for Gleam, 77,150 seeds/ac for Radiant, 74,514 seeds/ac for Lumen, and 75,712 seeds/ac for Palomino. Emergence of beans in June was poor due to the very wet planting conditions; poor stands are visible in aerial imagery (Figure 1). The study was planted 9 days after the surrounding field due to wet conditions.

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 plots were direct harvested on October 17 with a John Deere® S670 combine with a John Deere® 635F HydraFlex™ 35-foot head and Crary® Wind System. The temperature at harvest was 78°F and 16% relative humidity. Hot and dry weather conditions at harvest generally result in greater harvest loss through pod shattering. The poor emergence and stands resulted in low yields, which are not representative of these varieties in normal growing conditions.

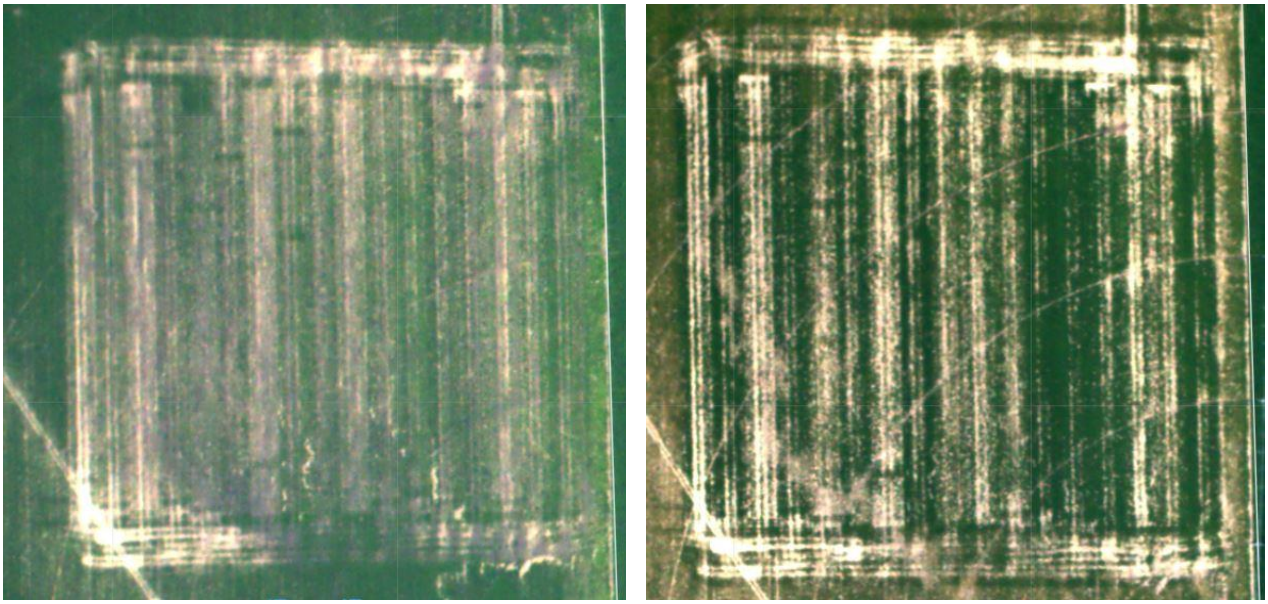


**Figure 1.** Wet conditions resulted in poor emergence as evidenced in aerial imagery from August 5 (left). The impact of poor emergence continued through the season, with poor stands visible in aerial imagery from September 3 (right) and resulting in low yields.

**Results:**

| | Stand Count (plants/ac) | % Pods >2" above-ground | Harvest Loss (bu/ac) | Small (%) | Split (%) | Foreign Material (%) | Damaged (%) | Moisture (%) | Density (lb/bu) | Seeds per lb | Yield (bu/ac)† | Marginal Net Return‡ ($/ac) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gleam | 85,600 A* | 70 A | 13 A | 4.4 B | 1.0 B | 0 A | 3.1 A | 12.6 B | 61.3 A | 1,488 A | 23 A | 269.49 A |
| Radiant | 70,136 AB | 61 B | 10 AB | 4.3 B | 2.3 A | 1 A | 2.2 A | 11.3 D | 59.1 B | 1,435 A | 17 B | 198.64 B |
| Lumen | 67,740 B | 63 AB | 7 B | 5.8 A | 1.0 B | 1 A | 3.1 A | 13.2 A | 61.4 A | 1,473 A | 11 C | 102.79 C |
| Palomino | 68,829 B | 56 B | 9 AB | 2.3 C | 2.0 AB | 1 A | 3.3 A | 11.8 C | 58.5 B | 1,448 A | 22 A | 266.07 A |
| P-Value | 0.055 | 0.013 | 0.027 | 0.0001 | 0.045 | 0.160 | 0.379 | <0.0001 | <0.0001 | 0.104 | <0.0001 | 0.0001 |

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre adjusted to 14% moisture and adjusted for clean yield (% splits, % small, and % foreign material removed).
‡Marginal net return based on $25/cwt ($15/bu at 60lb/bu). Seed cost for the bean seed was $73/100,000 seeds. Seed costs for each treatment were adjusted to represent the estimated actual seeding rate based on stand counts: $68.74/ac for Gleam, $56.32/ac for Radiant, $54.40/ac for Lumen, and $55.27/ac for Palomino.

**Summary:**

- There were significant differences in stand counts among the treatments.
- Gleam had the highest percentage of pods greater than 2" above the soil. Palomino had only 56% of pods greater than 2" above the soil.
- Despite having the greater percentage of pods 2" above the soil, Gleam had the greatest harvest loss.

- Percent splits, percent smalls, moisture, and density varied among treatments.
- There was no difference among varieties in seeds per lb, percent foreign material, or percent damage.
- Gleam and Palomino had the highest yield, followed by Radiant. Lumen had the lowest yield.
- Net return followed the same pattern as yield; Gleam and Palomino had the highest net return followed by Radiant. Lumen had the lowest net return.
- Market value for net return was adjusted for beans having more than 3% damage.
- The surrounding field was planted to Radiant variety pintos and the overall field average yield was 26 bu/ac.

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