

# **Irrigated Dry Bean Row Spacing by Population Trial at Otis in 2022**

## **Introduction**

A dry bean row spacing by seeding rate trial was conducted at one location in Northeast Colorado in 2022. The trial consisted of four treatments. Treatments included two different row spacings and two seeding rates. Data collected and summarized included soil test results, field management, yield, seed size, grain moisture, and grain test weight.

## **Approach**

The trial was planted on a farmer-cooperator field at Otis under center-pivot irrigation. Four combinations of treatments were tested on the pinto bean variety USDA Rattler. The treatments were 1) 30-inch row spacing with 83,000 seeds/acre seeding rate; 2) 30-inch row spacing with 103,000 seeds/acre seeding rate; 3) 15-inch row spacing with 83,000 seeds/acre seeding rate; and 4) 15-inch row spacing with 103,000 seeds/acre seeding rate.

The treatments were replicated four times and planted in ten feet wide plots that were thirty feet long. Harvested rows (and therefore harvested area) were adjusted accordingly for each plot depending on which row-spacing treatments were next to each other. If a 30-inch treatment plot was next to a 15-inch treatment plot, the outside rows were not harvested so data would not be skewed. No starter fertilizer was applied. The plots were desiccated to allow for direct harvest using a modified Case IH plot combine equipped with a flex head. Plot seed weight, moisture, and test weight were collected using a Harvest Master H2 grain weighing system on the combine. Seed yield was adjusted to 14% moisture content. Treatment yield results were analyzed using the mixed model procedure in SAS 9.4. Significant differences were determined using an alpha level of 0.30, which protects against false negatives (concluding treatments are the same when they are actually different).

Soil samples were pulled at planting (0-12 inch and 12-24 inch depth) and were analyzed at American Agricultural Laboratory, Inc. in McCook, Nebraska.

## **Results**

The average trial yield was 4,010 lb/acre, test weight was 60 lb/bu, moisture was 10 percent, and seeds per pound was 1,012. The purpose of the study was to determine if the combinations of row spacings or seeding rates influenced grain yield, pod distance from the ground, and harvest loss when direct harvesting.

There was not a significant difference in yield between the two seeding rate treatments ( $p = 0.35$ ), nor an interaction between the row spacing and seeding rate effects. There was a significant difference ( $p = 0.12$ ) in yield when comparing the two row spacing treatments averaged across the two seeding rates. The 15-inch spacing treatment had a yield of 4,181 lb/acre compared to a yield of 3,839 lb/ac for the 30-inch row spacing. There was not a significant difference of harvest loss among the treatments, but there was a difference ( $p = 0.003$ ) when comparing pod distance greater than 2 inches from the ground. The 15-inch row spacing treatments had fewer pods that were close to the ground (7% on average) compared to the 30-inch row spacing treatments (12% on average).

Soil test results for the site appear before the yield results. The soil type at the trial site is a Haxtun sandy loam.

## Soil Test Results (Pre-Season)

Organic Matter	Total N <sub>03</sub> Available	Soil pH	Phosphorus	Potassium	Sulfur (SO <sub>4</sub> )	Calcium	Magnesium	Sodium	Zinc	Iron	Manganese	Copper
percent	lb/acre						parts per million					
0.8	96	6.6	3	129	5	540	87	23	1.6	1.6	3.6	0.1

\*Samples were pulled down to 24 inches, nitrate is total for the 24-inch depth. Other results are based on top 12 inches of soil profile.

## Results Table

### 2022 Otis Dry Bean Row Spacing by Seeding Rate Trial Results

Treatment	Yield <sup>a</sup> lb/acre	Test	Seeds/Pound	Moisture	Pods less than 2"	Harvest Loss percent
		Weight lb/bu		percent	from ground percent	
<b>15" Row Spacing</b>	<b>4181</b>	<b>61</b>	<b>1068</b>	<b>11</b>	<b>7</b>	<b>4</b>
83,000 seeds/acre	4049	61	1040	12	8	4
103,000 seeds/acre	4312	60	1096	10	6	4
<b>30" Row Spacing</b>	<b>3839</b>	<b>60</b>	<b>956</b>	<b>9</b>	<b>12</b>	<b>4</b>
83,000 seeds/acre	3775	60	937	9	11	5
103,000 seeds/acre	3902	60	974	10	13	4
<b>Average</b>	<b>4010</b>	<b>60</b>	<b>1012</b>	<b>10</b>	<b>10</b>	<b>4</b>
Coefficient of Variation (CV)	9.9					

<sup>a</sup>Yields corrected to 14% moisture.

#### Site Information

Collaborator:	Corman Family Farms
Planting Date:	June 7, 2022
Harvest Date:	September 28, 2022
Soil Type:	Haxtun sandy loam
Fertilizer:	N at 50, P at 32 lb/ac
Herbicides:	Valor at 1 oz/ac, Moccasin at 16 oz/ac, and Prowl at 32 oz/ac Eptam at 2 pt/ac applied via chemigation on June 29th and July 20th Basagran at 12 oz/ac, Clethodim at 10 oz/ac, and Raptor at 4.2 oz/ac applied July 4th
Insecticides:	bifenthrin at 6 oz/ac applied July 4th Acephate applied on July 19th
Fungicides:	Copper sulfate applied July 19th
Trial Comments:	Excellent plant stands and weed control throughout the season. Desiccant sprayed on September 20th. All plots were direct-harvested with a combine equipped with a flex header.

*The data included in this table may not be republished without permission.*

*Contact Sally Jones-Diamond (sally.jones@colostate.edu)*