

Pinto bean performance with tillage systems, placement of starter fertilizer, row spacing and foliar fungicide, Carrington, 2011. (Greg Endres and Paul Hendrickson)

A field study was conducted at the NDSU Carrington Research Extension Center to examine the performance of pinto bean with several production factors including tillage systems, placement of starter fertilizer, row spacing and use of foliar fungicide for plant health. Experimental design was a randomized complete block with split-plot arrangement (whole plot = 2 row widths and split plots = 3 tillage systems and 4 fertilizer application methods) with four replications. The previous crop was wheat and fall standing stubble was 6- to 12-inches tall. The dryland trial was established on a Heimdal-Emrick loam soil with 4.0% organic matter, 6.3 pH, and phosphorus at 7 ppm (low). Conventional-till plots were roto-tilled at a 4-inch depth on October 15, 2010 and tilled on May 4, 2011 using a cultivator plus spring harrow. Fall strip-till treatments were imposed on November 8-9, 2010 using a Yetter strip-till opener with 22- and 30-inch row spacing using a 5- to 6-inch tillage depth that established a berm 10-inches wide. Fungicide-treated 'Lariat' was planted with a John Deere 71 4-row flex planter in 22- and 30-inch rows on May 25. Liquid 10-34-0 was applied as in-furrow, 2x0-inch band and mid-row band at 6 gal/A during planting. Two of four replications were treated with Headline at 6 fl oz/A plus NIS (Induce) at 0.25% v/v at R1-R3 plant stages on July 27 (3 days after hail damage) with a hand-boom sprayer with 8001 flat fan nozzles delivering 12 gpa at 35 psi. A killing frost occurred on September 14 with plants generally in the R7- to early R8- growth stages. Plants were hand pulled and placed in windrows on September 22, and seed harvested with a plot combine on September 27.

Crop residue levels taken after bean planting (June 1) using the line-transect method averaged 73% with no-till (direct seed), 42% with strip till, and 10% with conventional till. Pinto bean seed yield increased by 173 lb/A (9%) with 22-inch rows compared to 30-inch rows (Table 1). Plant emergence and days to flower generally were similar among tillage and placement of starter fertilizer treatments. Plant stand was reduced with starter fertilizer compared to the untreated check, except with strip till plus 2x0-inch fertilizer placement. With 2x0-inch fertilizer placement, conventional and no-till had greater yield compared to strip till. Among strip till treatments, yield tended to be highest with in-furrow fertilizer and lowest with mid-row banded fertilizer. Factor interactions were not statistically significant among agronomic and seed measurements. Seed yield and test weight were similar with the foliar fungicide and untreated check (Table 2).

Table 1. Soybean response to tillage system, placement of starter fertilizer and row spacing, Carrington, 2011.

Treatment ¹	Plant			Seed	
	Emerge	Flower	Stand (June 10)	Yield	Test weight
	Jday		plt/A	lb/A	lb/bu
Row spacing (inches):					
22	158	199	57,332	1997	58.5
30	158	199	53,897	1824	58.3
LSD (0.05)					
	NS	NS	NS	125	NS
Tillage system and placement of starter fertilizer:					
CT and 2x0" band	159	200	46,279	2066	58.6
NT and 2x0" band	159	200	48,921	1993	58.4
ST and 2x0" band	158	199	68,128	1844	58.4
ST and IF	158	199	54,306	2026	58.6
ST and MR band	158	199	53,883	1662	58.3
ST	158	199	62,167	1872	58.1
LSD (0.05)					
	NS	1	11,679	217	NS
mean	158	199	55,614	1910	58.4
CV (%)	0.3	0.3	20.6	11.1	1.0
Factor interactions:					
22, CT and 2x0" band	159	200	47,072	2119	58.5
30, CT and 2x0" band	159	200	45,486	2014	58.8
22, CT and 2x0" band	159	200	40,736	2081	58.6
30, CT and 2x0" band	159	199	57,106	1905	58.2
22, CT and 2x0" band	158	199	71,514	1861	58.6
30, CT and 2x0" band	159	199	64,742	1827	58.2
22, ST and IF	158	199	57,483	2150	58.8
30, ST and IF	158	200	51,130	1901	58.3
22, ST and MR band	158	199	59,293	1741	58.3
30, ST and MR band	158	199	48,474	1583	58.2
22, ST	158	199	67,893	2029	58.1
30, ST	158	199	56,442	1715	58.1
LSD (0.05)					
	NS	NS	NS	NS	NS
¹ CT=conventional till; NT=no-till (direct seed); ST = strip till. Starter fertilizer: IF=in-furrow; MR=mid row.					

Table 2. Pinto bean response to foliar fungicide, Carrington, 2011.

Treatment ¹	Yield bu/A	Test weight lb/bu
foliar fungicide	1864	58.3
untreated check	1956	58.5
C.V. (%)	17.3	1.1
LSD (0.05)	NS	NS

¹Headline = 6 fl oz/A + NIS (Induce) at 0.25% v/v to hail-damaged R1-3 stage plants.