

Pinto Bean Performance with Tillage Systems, Placement of Starter Fertilizer, Row Spacing and Foliar Fungicide, Carrington

Greg Endres, Steve Schaubert, Blaine Schatz, and Mike Ostlie

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 = two row widths and split plots = three tillage systems and four fertilizer application methods) with four replications. The previous crop was barley and fall standing stubble was 4- to 12-inches tall. The dryland trial was established on a loam soil with 3.8 percent organic matter, 7.8 pH, and phosphorus at 6 ppm (low). Conventional-till plots were roto-tilled at a 3-inch depth on October 31, 2011, and tilled on May 17, 2011, using a cultivator plus spring harrow. Fall strip-till treatments were imposed on October 31, 2011, using a Yetter strip-till opener with 22- and 30-inch row spacing using a 5-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 24. Liquid 10-34-0 was applied in-furrow at 3 and 6 gpa, and in 2x0-inch band at 6 gpa during planting. Two of four replications were treated with Headline at 6 fl oz/A plus NIS (Induce) at 0.125% v/v at R2-R5 plant stages on July 31 with a hand-boom sprayer with 8001 flat-fan nozzles delivering 12 gpa at 35 psi. Light hail damage occurred to the trial on August 24. Plants were hand pulled and placed in windrows on September 18, and seed harvested with a plot combine on September 26.

Crop residue levels taken on May 31 using the line-transect method averaged 31 percent with no-till (direct seed), 28 percent with strip till, and 11 percent with conventional till. Pinto bean seed yield was over 800 lbs/A (21%) higher with 22-inch rows compared to 30-inch rows (Table 1). Plant emergence was similar among tillage systems and placement of starter fertilizer while flower dates, canopy closure and physiological maturity generally were delayed with in-furrow application of 10-34-0. Plant stand with in-furrow fertilizer at 3 gpa was similar to the stand without starter fertilizer. However, 6 gpa of in-furrow applied 10-34-0 reduced plant stand by 21 percent compared to the untreated check. Seed yield was statistically similar among tillage systems and methods of fertilizer placement. Yield tended to be reduced with 6 gpa of in-furrow 10-34-0 compared to the untreated check. Factor interactions were not statistically significant among agronomic and seed measurements. Date of physiological maturity, seed yield and test weight were similar between the foliar fungicide and untreated check (Table 2).

Table 1. Pinto bean response to tillage system, placement of starter fertilizer and row spacing, Carrington, 2012.

Treatment ¹	Plant					Seed	
	Emerge	Flower	Canopy	Physiological	Stand	Yield	Test
			Closure	Maturity	(June 11)		Weight
			Jday		plt/A	lb/A	lb/bu
Row spacing (inches):							
22	158	200	208	255	59,820	3926	59.7
30	158	200	210	254	55,060	3118	60.0
LSD (0.05)	NS	NS	2	NS	2,975	438	NS
Tillage system and placement of starter fertilizer:							
CT and 2x0" band	159	199	209	254	54,352	3752	60
NT and 2x0" band	158	199	207	253	60,342	3429	60
ST and 2x0" band	158	198	208	253	62,228	3632	60
ST and IF at 3 gpa	158	202	209	256	58,969	3779	60
ST and IF at 6 gpa	158	204	211	260	47,833	3155	60
ST	158	198	209	251	60,915	3386	59
LSD (0.05)	NS	1	NS	3	5,150	NS	NS
Mean	158	200	209	255	57,440	3520	59.9
C.V. (%)	0.2	0.6	1.6	1.2	8.8	21.1	1.1

¹CT = conventional till; NT = no-till (direct seed); ST = strip till. Starter fertilizer = 10-34-0; applied in 2x0" band at 6 gpa; IF = in-furrow.

Table 2. Pinto bean response to foliar fungicide, Carrington, 2012.

Treatment ¹	Physiological maturity	Yield	Test weight
	Jday	bu/A	lb/bu
foliar fungicide	255	3426	59.9
untreated check	254	3617	59.8
C.V. (%)	1.1	22.8	1.1
LSD (0.05)	NS	NS	NS

¹Headline = 6 fl oz/A + NIS (Induce) at 0.25% v/v to R2-5 stage plants.