Dry Bean Performance with Tillage Systems, Placement of Starter Fertilizer and Foliar Fungicide

Greg Endres and Paul Hendrickson

A field study was conducted in 2007 and 2009-11 at the NDSU Carrington Research Extension Center to examine dry bean response to tillage systems (with emphasis on strip till), starter fertilizer and foliar fungicide. The previous crop was wheat and fall standing stubble was 6- to 12-inches tall. The dryland study was established on a loam soil with 3.6 to 4 percent organic matter, 6.3 to 7.6 pH, and a medium level of phosphorus (9 to 10 ppm) in 2009-10 and low level of phosphorus in 2011 (7 ppm). Strip-till treatments were established in the fall (October or November) using a Yetter strip-till unit producing 5- to 6-inch deep and 8- to 10-inch wide tilled strips. Conventional-till treatments were placed at a 3- to 4-inch depth in the fall and spring to establish residue levels less than 30 percent after planting. 'Lariat' pinto bean was planted with a John Deere 71 4-row flex planter in 30-inch rows (and 22-inch rows in 2011) during late May. Liquid 10-34-0 was applied at 4 gal/acre in 2010, and 6 gal/acre in 2009 and 2011 during planting as in-furrow, 2- by 0-inch (from seed) band and mid-row band. Headline fungicide at 6 fl oz/acre + nonionic surfactant was applied at early reproductive (R1-4) plant stages with a hand-boom sprayer. Plants were hand-pulled and windrowed, and seeds harvested with a plot combine.

Table 1 indicates seed yield response to tillage systems. Averaged across the four years, seed yield was similar with conventional and strip-till, and tended to be less with no-till (direct seeded). Averaged across three years, in-furrow fertilizer reduced plant stand 14 percent compared to the untreated check (Table 2). However, in-furrow and 2- by 0-inch banded fertilizer provided higher average yield compared to the mid-row banded fertilizer and untreated check. Foliar fungicide did not increase yield compared to the untreated check (Table 3).

Table 1. Dry bean yield with tillage systems, Carrington, 2007 and 2009-11.

Tillage system	2007	2009	2010	2011	4-year average
	---------- lb/ac ----------				
Conventional	1820	2533	2949	2066	2342
No-till	1886	2074	2824	1993	2194
Strip till	2129	2286	3069	1844	2332
LSD (0.05)	209	306	NS	217	X

Table 2. Strip till dry bean response to placement of starter fertilizer, Carrington, 2009-11.

Fertilizer Placement[1]	3-year average Plant Emerge	Stand	Days to Flower	Seed Yield
	Jday	plants/ac	Jday	lb/ac
Untreated check	157	45,290	200	2230
In-furrow	158	39,020	201	2440
2x0 inch band	157	50,045	200	2400
Mid-row band	157	48,065	200	2138

[1]10-34-0 applied at 4-6 gal/acre.

Table 3. Dry bean response to foliar fungicide, Carrington, 2009-11.

Treatment[1]	2009		2010		2011	3-yr average
	PM	Yield	PM	Yield	Yield	Yield
	Jday	lb/ac	Jday	lb/ac	lb/ac	lb/ac
fungicide	250	2168	243	2943	1864	2325
untreated check	249	2216	243	2972	1956	2381
C.V. (%)	0.2	11.7	0.9	8.7	17.3	x
LSD (0.05)	NS	NS	NS	NS	NS	x

[1]Headline = 6 fl oz/acre + NIS to R1-4 stage plants.

The study will be continued in 2012.