Impact of Selected Establishment Factors and Foliar Fungicide on Soybean Production, Carrington

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The field study initiated in 2011 and continued in 2012 at the NDSU Carrington Research Extension Center to examine soybean response to individual and combinations of selected establishment factors and foliar fungicide that may increase net return for producers. Experimental design was a randomized complete block with split-plot arrangement with four replications. Whole plots were planting dates (early and normal), split plots were tillage systems (conventional till and direct seed into standing small grain stubble), and starter fertilizer (untreated check, broadcast applied, 0x2-inch band, and mid-row band). The study was established on a Heimdal-Emrick loam soil with barley as the previous crop. Spring soil analysis indicating 101 lbs/A (0-24") nitrate-N, 9 ppm P, 178 ppm K, 3.2 percent organic matter, and 8.0 pH. Conventional-till plots were roto-tilled on November 10, 2011, and tilled on April 19, 2012, with a field cultivator plus harrow at a 3-inch depth. Inoculated, fungicide-treated (Cruiser) Dairyland Seed DSR0747/R2Y was planted on April 30 and May 15 in 30-inch rows with a John Deere 71 4-row flex planter. Gavilon liquid 6-24-6 was band applied during planting at 6 gpa or broadcast applied after planting at 9 gpa. Fungicide (Headline at 6 fl oz/A) + NIS (Preference at 0.125% v/v) was applied across two of four replicates on July 23 to R3-stage soybean. Visual assessment of foliar plant disease occurred on August 9 but notes were not taken due to very low disease incidence. The trial was harvested with a plot combine on September 26.

Crop residue was measured on May 31 using the line-transect method. An average of 37 percent residue was present in direct-seeded plots compared to 8 percent in conventional-till plots. Early-planted soybean emerged 10 days earlier, flowered 5 days earlier, matured 4 days earlier and had 11 additional days of growth from planting to maturity compared to later-planted soybean (Table 1). Early-planted soybean had a yield increase of 3.1 bu/A (6%) with higher oil but lower established stand, test weight and protein compared to the later-planted soybean. Direct-seeded soybean had a higher stand density but similar seed yield and quality compared to production with conventional tillage. Response to fertilizer treatments was similar. Statistically significant factor interactions: plant emergence date = planting date by tillage system and planting date by fertilizer placement; flower date = planting date by tillage system; test weight = planting date by fertilizer placement.

Table 1. Soybean response to main factors in establishment study, CREC, 2012.

		Plant				Seed				
Main Factor	Description	Emergence	Stand[1]	Flower	Physio-logical maturity	Yield	Test Weight	Number /lb	Oil	Protein
		date	plt/A	Jday	Jday	bu/A	lb/bu		%	%
	30-Apr	**137**	130,149	**182**	**259**	**53.7**	57.3	3007	**19.6**	30.2
Planting Date	15-May	147	**151,398**	187	263	50.6	**57.6**	3022	19.1	**30.7**
Tillage	conventional	142	136,623	**184**	261	52.5	57.5	2996	19.4	30.5
System	direct-seed	142	**144,923**	185	261	51.8	57.5	3033	19.4	30.4
	untreated check	142	140,026	185	261	51.8	57.4	3025	19.4	30.4
Starter	broadcast	142	142,682	185	261	51.7	57.5	3005	19.4	30.5
Fertilizer	0x2 inch band	142	134,797	184	261	52.5	57.5	2979	19.3	30.6
Placement	midrow band	142	145,587	185	261	52.5	57.4	3049	19.4	30.4
Mean		142	140,775	185	261	52.2	57.5	3015	1.0	1.4
C.V. (%)		0.4	10.7	0.4	0.4	6.6	0.5	4.7	19.4	30.5

LSD (0.05): bold-typed number pairs within colums for each factor are statistically different.

[1]Stand counts dates: Early planted = May 31; Late planted = June 11.

Physiological maturity, test weight and seeds/lb were similar between fungicide and untreated check (Table 2). Soybean seed yield was less with fungicide compared to the untreated check.

Table 2. Soybean response to foliar fungicide, Carrington, 2012.

Treatment[1]	Physiological Maturity	Yield	Test Weight	Seeds/lb
	Jday	bu/A	lb/bu	
foliar fungicide	261	51.3	57.4	3041
untreated check	261	53.0	57.5	2989
C.V. (%)	0.4	6.5	0.5	5.2
LSD (0.05)	NS	*	NS	NS

[1]Headline = 6 fl oz/A + NIS at 0.125% v/v to R3 stage soybean.