

### **Soybean response to early planting and P fertilizer application, Carrington, 2016.**

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The field study was conducted at the NDSU Carrington Research Extension Center and supported by the ND Soybean Council to examine soybean response to early planting and phosphorus (P) fertilizer application methods. Experimental design was a randomized complete block with split-plot arrangement with four replications. Whole plots were planting dates and sub plots were starter fertilizer (untreated check, broadcast applied, and 0x2-inch band). The study was established on a conventionally tilled loam soil with spring wheat as the previous crop. Spring soil analysis: 79 lb/A nitrate N, 6 ppm P, 133 ppm potassium, 3.4% organic matter and 8.1 pH. Gavilon liquid 6-24-6 was preplant broadcast applied at 11.5 gpa and mechanically incorporated on May 4, and band applied at 8 gpa during planting. Inoculated, fungicide-treated DSR 0404 seed was planted on May 5 and 18 in 22-inch rows. Hail damage occurred on July 9 resulting in an estimated  $\leq 30\%$  leaf loss to plants near or at the first flower (R1) stage of growth. Headline fungicide at 6 fl oz/A plus NIS at 0.25% v/v was applied to 2 of 4 trial replications on July 15 to evaluate potential soybean response after hail injury. The trial was harvested with a plot combine on September 30.

Averaged across P fertilizer application methods, soybean planted on May 5 required 17 days for plant emergence compared to 13 days required for emergence with the May 18 planting date (Table 1). According to NDAWN, daily average bare soil temperatures at 4-inch depth ranged from 60-67 degrees F during May 5-7 and 64 degrees F each day during May 18-20. The early planted soybean emerged 10 days earlier; reached first flower 18 days earlier; and was mature 8 days earlier compared to the later planted soybean. Plant stand, canopy closure and pod height generally were similar among planting dates, and plant lodging was absent. Seed yield was similar between planting dates. This likely was due to the July 9 hail damage that had greater impact on early planted soybean that was in the early reproductive stage versus later planted soybean in the vegetative stage. Also, adequate rain occurred during July and August (NDAWN: total of 8.2 inches) that likely negated any plant development advantages with the early planted soybean. Subtle differences generally occurred among seed quality factors with planting dates.

Across planting dates, P fertilizer application did not impact any plant or seed factors compared to the untreated check. There was no statistical significance for factors with the planting date by P application interaction (data not shown).

**Table 1. Soybean response to planting date and P fertilizer application, CREC, 2016.**

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Main factor	Description	Plant							Seed				
		Emergence	Canopy closure (August 15)	Stand (June 15)	Flower	Physiological maturity	Pod height <sup>a</sup>	Stand (Sept. 21)	Yield	Test weight	Number /lb	Oil <sup>b</sup>	Protein <sup>b</sup>
		Jday	%	plt/A	Jday	Jday	cm	plt/A	bu/A	lb/bu		%	
Planting date	5-May	141	83	177,675	183	255	3	207,905	49.4	55.4	2902	16.2	34.2
	18-May	151	87	156,245	201	263	4	184,365	50.2	55.8	2997	15.7	34.4
LSD (0.05)		1	4	NS	1	1	NS	18,205	NS	0.3	43	0.1	NS
Starter fertilizer placement	untreated check	146	85	169,780	192	259	4	202,775	50.7	55.6	2955	16.0	34.3
	broadcast	146	86	175,365	192	259	3	200,055	49.2	55.6	2940	16.0	34.2
	band	146	85	155,745	192	259	3	185,575	49.7	55.5	2953	16.0	34.3
LSD (0.05)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CV %		0.5	5.0	15.7	0.2	0.6	59.6	10.7	9.5	0.6	1.7	1.1	0.8
<sup>a</sup> Base of pod to soil surface.													
<sup>b</sup> Values at 13% moisture.													

Post fungicide application to hail-damaged soybean plants did not impact canopy closure, plant maturity or yield compared to the untreated check (Table 2).

**Table 2. Soybean response to foliar fungicide, Carrington, 2016.**

Treatment	Canopy closure (Aug. 15)	Physiological maturity	Yield	Test weight
	%	Jday	bu/A	lb/bu
untreated check	84	258	47.8	55.5
fungicide <sup>a</sup>	86	260	51.8	55.6
LSD (0.05)	NS	NS	NS	** <sup>b</sup>

<sup>a</sup>Headline applied at 6 fl oz/A + NIS at 0.25% v/v to pre- or at R1-stage soybean 6 days after hail damage.

<sup>b</sup>Statistically significant at 0.01.