

**Soybean response to plant nutrition inputs, Wishek, 2017.**

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A field trial was conducted at the CREC Tri-county off-station crop research site near Wishek with support from the ND soybean Council. Trial objectives were to measure soybean response to rhizobia bacteria seed inoculation, soil- and foliar-applied sulfur fertilizer, and special foliar inputs. Experimental design was a randomized complete block with four replications. Previous crops were spring wheat in 2016 and soybean in 2015. Spring 2017 soil test indicated 59 lb nitrate N/acre, 16 ppm P (Olsen), 189 ppm K, 0.44 ppm Zn, 3.9% organic matter, 6.3 and 7.0 pH (0-6" and 6-24" soil depth), and 0.31 and 0.55 mmho/cm soluble salts (0-6" and 6-24" soil depth). Soil bacteria count was 3911/g soil. Proseed '30-20 RR2Y' was seeded in 14-inch rows on May 18. Foliar inputs were applied on August 1 to R3-4 stage soybean with a hand-boom sprayer with 8001 flat-fan nozzles delivering 10 gpa at 35 psi. Plant samples also were taken on August 1 from the untreated check and seed inoculation treatments for ureide-N analysis. Rainfall totaled 9.3 inches during April to September but only 2.3 inches was received April through June (NDAWN). Seed was harvested with a plot combine on October 12.

Trial plant density averaged 153,700 plants/acre on August 1. Seed yield, test weight, seed count, and seed oil and protein content were statistically similar among treatments, though yield tended to increase with inputs compared to the untreated check (Table). With similar P2O5 fertilizer rates, MES15 tended to improve yield possibly due to S content, compared to 11-52-0. Soil bacteria and plant tissue ureide-N levels (untreated check = 2645 ppm; three seed inoculation treatments = 2245-2914 ppm) indicated seed yield and protein response was unlikely with rhizobia bacteria seed inoculation. Thus, yield with double seed inoculation did not improve compared to single liquid or granular inoculation. Also, seed yield did not differ among the four foliar treatments, though foliar S tended to have less yield.

Table.								
Treatment				Seed				
Number	Product <sup>a</sup>	Product rate/acre	Application method/timing	Yield	Test weight	Number /lb	Oil	Protein
				bu/A	lb/bu		%	%
1	untreated check	x	x	40.2	56.5	3390	18.3	36.1
2	11-52-0	56 lb	Preplant broadcast	44.1	56.5	3200	18.3	36.1
3	MES15	89 lb	Preplant broadcast	50.4	56.4	3370	18.4	35.6
4	Cell-Tech granular inoculant	13.1 lb	in-furrow	45.8	56.6	3160	18.2	36.1
5	Optimize liquid inoculant	1.4 fl oz/100 lb seed	seed	45.9	56.2	3360	18.5	35.6
6	granular and liquid inoculant	same as above	in-furrow and seed	45.3	56.6	3150	18.2	36.3
7	Ascend	6.4 fl oz	R3-4	47.6	56.5	3240	18.2	36.3
8	Priaxor + NIS	4 fl oz + 0.25%	R3-4	47.8	56.3	3300	18.5	35.8
9	MAX-IN Ultra ZMB	32 fl oz	R3-4	47.9	56.5	3260	18.1	36.2
10	MAX-IN S	64 fl oz	R3-4	43.5	56.2	3260	18.3	36.2
mean				46.0	56.4	3270	18.3	36.0
CV (%)				13.6	0.5	6.3	2.8	2.5
LSD (0.05)				NS	NS	NS	NS	NS

<sup>a</sup>All treatments included seed with rhizobia bacteria inoculant except untreated check.