## Soybean response to rhizobia bacteria seed inoculation methods, Carrington, 2017.

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An irrigated field trial was conducted at the Carrington REC with support from the ND Soybean Council to examine the response of soybean to various rhizobia bacteria seed inoculation methods, including double inoculation. In addition, sampling and tests to determine soil rhizobia bacteria and plant tissue ureide-N levels were conducted to add to a database to predict yield response to seed inoculation. Experimental design was a randomized complete block with four replications. Previous crops were barley in 2016, corn in 2015, and soybean in 2014. Manure at 34.3 tons/A was applied and incorporated on May 4, with predicted nitrate-N at 137 lb/A and P at 158 lb/A available during the 2017 season. Spring soil test indicated 51 lb nitrate N/acre, 10 ppm P (Olsen), 215 ppm K, 2.9% organic matter, 7.9 and 8.3 pH (0-6" and 6-24" soil depth), and 0.28 and 0.18 mmho/cm soluble salts (0-6" and 6-24" soil depth). Soil rhizobia bacteria count was 189/g soil. Proseed '30-20 RR2Y' was seeded in 14-inch rows on May 23. Plant samples were taken for ureide-N analysis at the R2 soybean stage on July 21. Seed was harvested with a plot combine on October 6.

Plant development and stand were statistically similar among treatments (Table). Ureide-N levels were similar among treatments though the full rate of granular inoculant tended to have higher ureide-N levels than the untreated check. The untreated check averaged above 1500 ppm, which suggests N fixation was adequate without seed inoculation. Seed yield, test weight, seed count, and seed oil and protein content were statistically similar among treatments, including double inoculation.

Table.															
Treatment				Plant							Seed				
					Early				Late						
			Application		stand				stand						
		Product	method/		(June		Canopy	Maturity	(Sept.	Ureide-		Test	Number		
Number	Product	rate	timing	Emerge	12)	Flower	closure	(R8)	28)	Ν	Yield	weight	/lb	Oil	Protein
				Jday	plt/A		Jday		plt/A	ppm	bu/A	lb/bu		%	%
		-		<b>.</b>				•							
1	untreated check	Х	x	156	143,000	196	205	264	149,400	1596	68.0	56.9	3018	17.7	35.9
	Cell-Tech granular														
2	inoculant	13.1 lb/A	in-furrow	156	130,910	197	206	264	132,330	1851	65.0	56.9	3014	17.7	36.2
		1.4 fl													
	Optimize liquid	oz/100 lb													
3	inoculant	seed	seed	156	136,600	197	206	264	110,980	1653	61.0	56.9	2975	17.8	36.1
		13.1 lb/A													
		and 1.4 fl													
	granular and liquid	oz/100 lb	in-furrow												
4	inoculant	seed	and seed	155	167,900	196	204	263	159,360	1856	66.2	56.7	2983	17.9	35.8
		6.6 lb/A													
		and 1.4 fl													
	granular and liquid	oz/100 lb	in-furrow												
5	inoculant	seed	and seed	156	145,850	197	205	264	146,560	1630	69.5	56.8	2993	17.7	36.1
		1	<b>F</b>	1				1	1						
mean				155	144,850	196	205	264	139,730	1,717	65.9	56.8	3000	17.8	36.0
CV (%)	_			0.3	12.2	0.4	0.7	0.3	20.7	20.5	7.7	0.4	2.5	0.8	1.1
LSD (0.05)				NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS