

Soybean response to sulfur, Wishek, 2019.

(Greg Endres, Tim Indergaard, Mike Ostlie, Sheldon Gerhardt, Crystal Schaunaman and Emily Trzpuć)

A field trial was conducted at the CREC Tri-county off-station crop research site near Wishek with support from the ND Soybean Council to evaluate soybean response to soil- and foliar-applied sulfur (S) fertilizer. Experimental design was a randomized complete block with four replications. The trial was established on a reduced-till loam soil with spring wheat as the previous crop with spring soil test indicating 82 lb/A N, 28 ppm P (Olsen), 208 ppm K, 4.3% organic matter, 6.7 buffer pH (0-6" depth), and 0.19 mmho/cm soluble salts (0-6" depth). Preplant fertilizer treatments were applied June 3 followed by planting of 'PFS19B04' seed inoculated with rhizobium bacteria in 14-inch rows. Foliar S was applied on July 25 to R2-stage soybean with a hand-boom sprayer with 80015 flat-fan nozzles delivering 14 gpa at 35 psi. Seed was harvested with a plot combine on November 6. Rainfall totaled 23.6 inches during May through October compared to the long-term average for the period of 13.2 inches (NDAWN).

Trial plant density averaged 183,000 plants/acre on July 2. Seed yield increased 5.6 bu/A (11%) and 6.9 bu/A (14%) with 10 and 20 lb/A of sulfate S, respectively, compared to the untreated check (Table). The yield response to S likely was due to the abnormally high amount of rain during the season that leached residual soil S out of the soybean root zone. Soybean did not response to the low amount of foliar-applied S. Also, yield was reduced with the high foliar-applied S rate, likely due to leaf burn, plus cost of product to reach the recommended amount of applied S (10 lb S/A) is not economically feasible. Test weight, and seed oil and protein content were statistically similar among treatments.

Table.							
Treatment				Seed			
Number	Product ^a	Product rate/acre	Application method/timing	Yield	Test weight	Oil	Protein
				bu/A	lb/bu	%	%
1	untreated check	x	x	43.9b	56.4	17.0	38.1
2	11-52-0	42.5 lb	Preplant broadcast	47.4ab	56.4	17.2	38.0
3	MES15 - 10 lb S	67 lb		49.4a	56.2	17.1	38.0
4	MES15 - 20 lb S	134 lb		50.8a	56.2	16.9	38.3
5	MAX-IN S - 0.74 lb S	64 fl oz	R2	46.6ab	56.3	17.2	38.1
6	MAX-IN S - 10 lb S	6.8 gpa	R2	36.1c	56.5	17.2	38.0
mean				45.7	56.3	17.1	38.1
CV (%)				7.6	1.0	1.3	1.0
LSD (0.05)				4.3	NS		

^aAll treatments included seed with rhizobia bacteria inoculant.