

Corn response to starter and post-applied fertilizer, Carrington, 2021.

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A field study continued at the NDSU Carrington Research Extension Center, and supported by the ND Corn Utilization Council, to examine the performance of corn with starter P and Zn, and foliar S and Zn. Experimental design was a randomized complete block with four replications. The trial was established on conventionally tilled, Heimdal-Emrick loam soil with 3.4% organic matter, 8.0 (0-6 inches) and 8.4 (6-24 inches) pH, 0.71 mmho/cm (0-6 inches) and 0.75 mmho/cm (6-24 inches) soluble salts, 58 lb nitrate-N/acre, 4 ppm (low) P, 150 ppm K and 0.48 ppm (low) Zn. Soybean was the prior crop in 2020. PPI treatments were applied May 6 and incorporated with a field cultivator plus harrow. DeKalb 'DKC32-12RIB' (82-day relative maturity) Roundup Ready corn was planted at 31,000 seeds/A with a John Deere 71 4-row flex planter on May 10 in 30-inch rows, and included in-furrow (IF) and surface-dribbled fertilizer treatments. Significant rain was delayed until May 22 (0.86 inches; NDAWN) to provide incorporation of the surface-applied fertilizer. Foliar S and Zn were applied on June 19 at the V5-6 growth stages using a hand-boom sprayer. NDAWN monthly rain (inches): May=1.4; June=1.8; July=0.1; August=2.6; September=2.0; October=3.7; and 6-month total=11.6. Grain was harvested with a plot combine on November 2.

Time from corn planting to plant emergence and silking were similar among treatments (Table). Early season plant stand (measured at V5-6 growth stages) generally was reduced (11-16%) with IF 10-34-0 compared to the untreated check. Plant height was similar among treatments. Grain yield, test weight, harvest moisture and seed quality except starch were similar among treatments.

Table. Corn response to in-furrow starter and foliar fertilizer, Carrington, 2021.

Treatment			Plant				Seed					
Fertilizer ¹	Rate gpa	Application method	Emergence	Silk	Stand (20- Jun)	Height (2-Jul)	Yield	Test weight	Harvest moisture	Protein	Oil	Starch
			DOY ²		pl/A	cm	bu/A	lb/bu		%		
untreated check	x	x	144	206	31,540	69	80.2	58.5	13.0	10.0	3.8	69.6
TSP+AS+ZnS	174 + 83 + 5.6 lb	PPI	143	205	31,540	79	81.0	57.7	13.1	10.8	3.8	69.0
TSP+AS+ZnS/10- 34-0	174 + 83 + 5.6 lb/3	PPI /in- furrow	144	205	26,560	73	74.2	59.1	13.1	10.2	3.8	69.0
MESZ/ 10- 34-0	200 lb/3	PPI/in- furrow	144	205	26,560	74	85.3	58.6	13.1	10.4	3.8	69.1
10-34-0	3	in-furrow surface	145	207	28,220	65	71.4	59.2	13.1	10.0	3.9	69.1
10-34-0	3	dribble	145	207	29,880	69	72.1	58.8	13.1	9.9	3.8	69.5
10-34-0 + Zn	2.75 + 0.25	in-furrow	144	206	28,220	78	78.4	58.3	13.1	10.4	3.8	68.9
10-34-0/Zn	3/0.25	in-furrow/ foliar	144	206	29,880	69	75.5	58.7	13.3	10.5	3.9	69.0
10-34-0 + Zn/S	2.75 + 0.25/0.5	in-furrow/ foliar	146	208	27,890	66	79.6	59.0	13.1	9.4	3.8	69.6
mean			144	206	29,180	71	77.5	58.6	13.1	10.2	3.8	69.2
C.V. (%)			1.5	1.1	9.1	18.0	14.0	1.6	2.9	7.7	1.3	0.6
LSD (0.10)			NS	NS	3200	NS	NS	NS	NS	NS	NS	0.5

¹Average of two untreated checks. TSP=triple superphosphate (0-46-0); AS=Ammonium sulfate (21-0-0-24); ZnS=zinc sulfate (35.5% Zn and 17.5% S); MESZ=Microessentials SZ (12-40-0 10S 1Zn); chelated Zn=Ammend (8% N and 9% Zn; West Central); S=MAX-IN S (0-0-19-13; Winfield).

²Day of Year: 144=May 24; 206=July 25.