Corn response to starter and post-applied fertilizer, Carrington, 2018.
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A field study continued at the NDSU Carrington Research Extension Center to examine the performance of corn with starter P and Zn, foliar S and Zn, and post N. Experimental design was a randomized complete block with four replications. The trial was established on conventionally tilled, Heimdal-Emrick loam soil with 3.1% organic matter, 7.9 (0-6 inches) and 8.0 (6-24 inches) pH, 0.34 mmho/cm (0-6 inches) and 0.42 mmho/cm (6-24 inches) soluble salts, 137 lb nitrate-N/acre, 6 ppm (low) P, 138 ppm K and 0.33 ppm (low) Zn. Oat was the prior crop in 2017. 0-46-0 was preplant incorporated (PPI) on May 1. DeKalb 'DKC33-78 RIB' (83-day relative maturity) Roundup Ready corn was planted with a John Deere 71 4-row flex planter on May 4 in 30-inch rows, and included in-furrow (IF) and surface-dribbled fertilizer treatments. Rain totaled 0.36 inches on May 8-9 to partially incorporate the surface-applied fertilizer. Trial area was soil sampled June 18 for the pre-sidedress soil nitrate test (PSNT) and analysis was 106 lb nitrate-N/acre. UAN at 50 lb N/acre was side-dressed by coulter injection on June 20 at the V6 stage to two of four trial replications. Foliar S and Zn were applied on June 18 at the V6 stage using a hand-boom sprayer delivering 17 gpa through 8001 flat-fan nozzles at 35 psi. Grain was harvested with a plot combine on October 30.

Time from planting to plant emergence generally was extended 1-2 days with fertilizer compared to the untreated check (Table 1). Silk date generally was similar among fertilizer treatments and the untreated check. Plant stand was statistically similar among treatments, averaging 33,370 plants/acre, but tended to be higher with the untreated check compared to IF 10-34-0. Plant height increased an average of 2.1 inches/day during the 21 days between measurements. Plant height generally was slightly higher with fertilizer compared to the untreated check on July 6.
Grain yield was similar among all treatments including the untreated check. PPI 0-46-0 followed by IF 10-34-0 tended to have the highest yield of fertilizer treatments and had the heaviest test weight. Grain moisture, protein, oil, and starch were similar among treatments. Grain yield, test weight, and harvest moisture was not impacted with side-dressed N compared to the untreated check (Table 2).

Table 1. Corn response to starter and foliar fertilizer, Carrington, 2018.

Liquid fertilizer[1]	Rate	Application method		Emerge	Silk	Stand (5-May)	Height (15-June)	Height (6-July)		Yield	Test weight	Moisture	Protein	Oil	Starch
	gpa			DOY[2]		plt/A	cm			bu/A	lb/bu	%			
untreated check	x	x		140	197	37,185	22	128		185.5	56.0	16.7	9.7	3.7	71.6
0-46-0/ 10-34-0	143.5 lb/3	PPI/in-furrow		141	196	31,873	25	138		187.3	56.9	16.7	9.4	3.7	71.7
10-34-0	3	in-furrow		141	197	31,873	21	132		172.9	56.0	16.9	9.7	3.7	71.6
10-34-0	3	2" surface dribble		141	197	35,193	19	128		167.2	56.0	17.0	9.5	3.7	71.9
10-34-0 + Zn	2.75 + 0.25	in-furrow		140	196	31,873	24	139		192.9	56.3	16.8	9.5	3.7	71.8
10-34-0/ Zn	3/0.25	in-furrow/ foliar		142	197	31,209	23	134		173.2	56.3	17.1	9.7	3.8	71.6
10-34-0/ S	3/0.5	in-furrow/ foliar		141	196	31,873	24	137		176.3	56.2	16.8	9.3	3.8	71.9
RizeR + water	2.5 + 0.5	in-furrow		141	197	35,857	20	129		177.8	56.2	17.0	9.7	3.7	71.7
mean				141	196	33,367	22	133		178.9	56.2	16.9	9.6	3.7	71.7
CV (%)				0.5	0.3	14.1	16.9	4.9		7.5	0.8	1.6	3.0	2.6	0.3
LSD (0.10)				1	1	NS	NS	8		NS	0.6	NS	NS	NS	NS

[1]Zn: 9.5% N, 4% S, and 10% Zn (Northwest Chemical). MAX-IN S= 0-0-19-13 (Winfield). RizeR: 7% N, 17% P, 3% K, 0.95% Zn, 0.2% Fe, 0.06% Mn, and 0.07% Cu (Loveland).

[2]Day of Year: 141=May 21; 196=July 15.

Table 2. Corn response to side-dressed N, Carrington, 2018.

	Seed		
Treatment	Yield	Test weight	Moisture
	bu/A	lb/bu	%
untreated check	183.5	56.4	16.9
post N[a]	174.3	56.1	16.8
mean	178.9	56.2	16.9
CV (%)	7.1	0.6	1.3
LSD (0.05)	NS	NS	NS

[a]Post N applied as UAN (28-0-0) at 50 lb nitrate-N/acre at V6 stage.