Corn response to starter and post-applied fertilizer, Carrington, 2017.
(Greg Endres and Mike Ostlie)

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 3.2% organic matter, 7.5 (0-6 inches) and 8.0 (6-24 inches) pH, 0.62 mmho/cm (0-6 inches) and 2.1 mmho/cm (6-24 inches) soluble salts, 58 lb nitrate-N/acre, 8 ppm (med) P, 235 ppm (high) K and 0.51 ppm (low) Zn. Field pea was the prior crop in 2016. DeKalb 'DKC33-78 RIB' (83 day relative maturity) Roundup Ready corn was planted with a John Deere 71 4-row flex planter on May 3 in 30-inch rows, and included in-furrow (IF) and surface-dribbled fertilizer treatments. Trial area was soil sampled June 21 for the pre-sidedress soil nitrate test (PSNT) and analysis was 104 lb nitrate-N/acre. UAN at 55 lb N/acre was side-dressed by coulter injection on June 23 at the V5 stage to 2 of 4 trial replications. Foliar S and Zn were applied on June 29 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 23.

Time from planting to plant emergence was statistically similar among treatments, while silk date generally was a day earlier among fertilizer treatments compared to the untreated check (Table 1). Plant stand was similar among treatments but tended to be higher with the untreated check, surface-dribbled 10-34-0 and RizeR compared to other fertilizer treatments. Also, the stands with IF-applied 10-34-0 and 6-24-6 (low-salt fertilizer) were similar. Grain yield was similar among all treatments but tended to improve with fertilizer compared to the untreated check. The surface-dribbled 10-34-0 tended to have the highest yield of fertilizer treatments. Heaviest test weight occurred with IF-applied 10-34-0 and 6-24-6. Harvest seed moisture with RizeR was less compared to the untreated check. Grain yield and test weight with side-dressed N tended to increase but was statistically similar to the untreated check (Table 2).

Table 1. Corn response to starter and foliar fertilizer, Carrington, 2017.

Treatment			Plant[1]				Seed					
Liquid fertilizer[2]	Rate	Application method	Emerge	Silk	Stand (5-May)	Height (27-June)	Yield	Test weight	Moisture	Protein	Oil	Starch
	gpa		Jday[a]		plt/A	inches	bu/A	lb/bu	%			
untreated check	x	x	136	205	39,177	19	147.5	57.2	16.0	10.0	3.8	71.3
10-34-0	3	in-furrow	136	203	34,529	21	153.5	58.1	16.2	9.4	3.8	71.6
10-34-0	3	2" surface dribble	136	205	39,177	18	163.0	57.3	15.8	9.4	3.7	71.7
10-34-0 + Zn	2.75 + 0.25	in-furrow	136	204	36,521	20	151.7	57.7	15.5	9.6	3.9	71.5
10-34-0/Zn	3/0.25	in-furrow/ foliar	136	204	36,521	21	158.1	57.6	15.8	9.4	3.9	71.6
10-34-0/S	3/0.5	in-furrow/ foliar	137	204	36,521	19	145.3	57.7	15.8	9.2	3.8	71.8
RizeR + water	2.5 + 0.5	in-furrow	136	204	39,177	21	154.8	57.2	15.1	8.8	3.8	72.1
6-24-6	4.5	in-furrow	136	204	35,193	19	152.7	57.8	15.8	9.4	3.7	71.8
mean			136	204	37,102	20	153.3	57.6	15.7	9.3	3.8	71.7
CV (%)			0.2	0.4	10.4	6.3	5.3	0.7	2.4	6.0	3.1	0.7
LSD (0.05)			NS	1	NS	2	NS	0.6	0.6	NS	NS	NS

[1]Jday: 136=May 16; 204=July 23.

[2]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). 6-24-6: 6% N, 24% P, and 6% K (Gavilon Fertilizer).

Table 2. Corn response to side-dressed N, Carrington, 2017.			
	Seed		
Treatment	Yield	Test weight	Moisture
	bu/A	lb/bu	%
untreated check	145.6	57.3	15.7
post N[a]	161.1	57.8	15.9
mean	153.3	57.6	15.8
CV (%)	5.8	0.7	0.6
LSD (0.05)	NS	NS	NS

[a]Post N applied as UAN (28-0-0) at 55 lb nitrate-N/acre at V5 stage.