

Corn Response to Fertilizer Placement and Starter Fertilizer Rates

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Due to increases in fertilizer costs and corn acreage, projects were initiated at the Carrington Research Extension Center to evaluate corn response to fertilizer placement and to 10-34-0 starter fertilizer rates.

The experiments were conducted at the Carrington Research Extension Center in 2007 using conventional tillage practices. A fall soil test indicated 48 lbs. N/ac, 5 ppm P₂O₅, 225 ppm K₂O, and 8.0 pH. The previous crop was soybean (40 lbs. N/ac credit).

Corn Response to Fertilizer Placement: The total nitrogen and phosphorus applied was 65 lbs. N (total N/ac = 153 lbs.) and 48 P₂O₅ per acre. 'DKC 38-33' corn was sown May 9 in 30-inch rows at 26,400 pure live seeds/acre. Fertilizer rates and placements are listed in the table 2. The broadcast applications were made prior to planting and incorporated. The in-furrow application was made at planting. The 2 x 0, 7 x 0 and 15 x 0 (2, 7, and 15 inches to the side of the seed row) applications were made on May 18. The trial was harvested November 8.

Table 1. Fertilizer rates and placement.

Trt.	Fertilizer	Rate gal/ac	Placement
1	10-34-0	12.5	Broadcast
	28-0-0	17	Broadcast
2	10-34-0	8.5	Broadcast
	28-0-0	17	Broadcast
	10-34-0	4	In-Furrow
3	10-34-0	12.5	2x0
	28-0-0	17	2x0
4	10-34-0	4	In-Furrow
	10-34-0	8.5	7x0
	28-0-0	17	7x0
5	10-34-0	4	In-Furrow
	10-34-0	8.5	15x0
	28-0-0	17	15x0
6	10-34-0	4	In-Furrow
	10-34-0	8.5	2x0
	28-0-0	17	2x0

Plant stand (24,090 plants/ac), days to silk (77 days), and ear and plant height (42 and 91 inches), harvest moisture (17.7%), test weight (58.9 lbs./bu) or grain yield (147 bu/ac) were similar among treatments (data not shown).

Corn response to Starter Fertilizer: Nitrogen was applied at 124 lbs./ac prior to planting and incorporated. 'DKC 38-33' corn was sown May 10 in 30-inch rows at 26,400 seeds/acre. Fertilizer rates and placements are listed in table 2. The Rebounder is designed to improve the accuracy and uniformity of in-furrow seed placement. The Y-Not-Split-It is held in place by the Rebounder and diverts the flow of fertilizer off the seeds and onto the sides of the trench. Avail is a fertilizer enhancer that inhibits phosphate fertilizer from becoming fixed in the soil, increasing phosphorus availability to plants. The trial was harvested November 8.

Table 2. Corn response to starter fertilizer rates and placement.

Fertilizer Rate gal/ac	Placement ^a	Plant Population plants/ac	Days to Silk	Ear Height inch	Plant Height inch	Harvest Moisture %	Test Weight lb/bu	Grain Yield bu/ac
0		23,837	79	41.1	90.0	16.6	58.1	101
2	in-furrow	22,531	78	42.2	90.4	17.4	58.6	121
4	in-furrow	24,817	78	43.6	90.4	17.9	58.7	135
6	in-furrow	23,837	77	44.3	92.0	17.8	58.8	150
8	in-furrow	24,817	78	43.1	92.1	18.3	58.0	156
10	in-furrow	24,490	78	44.6	90.3	18.2	58.7	153
4	R	25,143	78	43.3	96.0	17.5	58.3	139
8	R	24,490	78	44.6	95.2	18.7	58.3	145
8	RY	24,164	78	42.7	91.7	17.9	58.3	145
8 + Avail	RY	22,858	77	43.3	91.3	18.7	58.8	151
10	RY	24,490	77	43.9	94.7	17.6	58.4	142
12	RY	26,123	78	45.5	94.4	19.0	58.2	155
18	RY	24,817	77	41.8	97.7	18.3	58.8	157
18	2x0	26,776	77	43.9	92.2	18.2	58.6	150
18 + Avail	2x0	24,164	78	43.7	96.2	18.8	58.5	158
8	2x0	26,776	78	43.9	91.3	18.3	58.4	148
MEAN		24,663	78	43.5	92.9	18.1	58.5	144
C.V.%		12.1	1.2	6.4	4.5	5.4	1.2	10.8
LSD (0.05)		NS	NS	NS	NS	NS	NS	22

^aR=Rebounder and RY=Rebounder plus Y-Not-Split-It.

Plant stand, days to silk, ear and plant height, harvest moisture, and test weight were similar among treatments (Table 2). Grain yield increased as the starter fertilizer rate increased to 6 gal/ac, and then leveled off. Using a Rebounder, Rebounder plus Y-Not-Split-It, or Avail provided yields similar to the in-furrow application at the same fertilizer rate. Seed yields were expected to be similar with the Rebounder since the planting speed was less than 3 mph. The higher fertilizer rates applied with the Y-Not-Split-It did not reduce stands, but it also did not increase grain yield. Even though the higher rates of fertilizer did not reduce plant stands, this is only one year of data. Current NDSU recommendations limit the amount of starter fertilizer in the seed row to about 8 gal/ac (10 lbs. N + K₂O).