Corn Response to Nitrogen

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Experiments were conducted at the Carrington Research Extension Center in 2008 to evaluate corn response to nitrogen (N) rates. Studies were established using conventional tillage practices at an irrigated and dryland site. A fall 0-2 soil foot test indicated 59 lbs. N/ac at the irrigated site and 53 lbs. N/ac at the dryland site. The previous crop at both sites was spring wheat. 'DKC 38-33' corn was sown May 9 in 30-inch rows at 26,400 pure live seeds/acre and 22-inch rows at 36,000 pure live seeds/acre. The N rates were 0, 50, 100, and 150 lbs. N/acre. The N source material was urea. Nutrisphere-N (www.simplot.com) is a polymer coated urea from Simplot (Tables 1 and 2). AgBlend is a soil additive and SoilBuilder is a microbial soil amendment product. Both products are from AMS (superbio.com). AgBlend and SoilBuilder were applied July 3 to 5-7 collar corn at 1.5 gal/acre with a CO^2-pressurized hand-boom sprayer delivering 20 gal/acre. (Tables 1 and 2). The dryland trials were harvested November 9 and the irrigated trials were harvested November 16.

Applying nitrogen did not increase grain yield when compared to the untreated check (Tables 1-4). Four foot soil samples should have been taken to help determine how much total nitrogen was available within the root zone.

Table 1. 30-inch row dryland corn response to nitrogen.

Nitrogen Rate	Days to Silk	Ear Height	Plant Height	Harvest Moisture	Seed Protein @ 0% Moisture	Starch Content @ 0% Moisture	Test Weight	Grain Yield
lb/ac		inch			%		lb/bu	bu/ac
0	87.5	40.4	90.7	23.7	10.6	70.0	55.9	131
50	87.5	40.4	93.3	22.5	11.0	69.4	56.0	137
100	87.8	38.6	93.5	24.2	11.2	69.3	55.5	134
150	87.5	41.9	93.7	22.6	11.3	69.6	56.1	138
50 + Nutrisphere-N	87.5	40.4	93.7	22.7	11.0	69.6	57.5	135
100 + Nutrisphere-N	88.5	40.7	93.7	23.3	11.1	69.6	55.9	138
50 / AgBlend	87.5	39.6	92.9	21.8	11.0	69.7	56.9	130
100 / AgBlend	87.5	40.2	92.5	22.9	11.1	69.6	57.1	139
50 / SoilBuilder	87.3	38.4	91.3	22.9	11.1	69.5	55.9	138
100 / SoilBuilder	87.8	40.4	92.5	23.0	11.0	69.7	56.4	132
LSD (P=.05)	NS	NS	NS	NS	0.3	NS	NS	NS
CV	0.83	4.63	2.38	6.89	1.95	0.61	2.41	6.06
Grand Mean	87.6	40.1	92.8	23.0	11.0	69.6	56.3	135
Treatment Prob(F)	0.5698	0.3178	0.548	0.6829	0.007	0.5313	0.546	0.7736

Table 2. 30-inch row irrigated corn response to nitrogen.

Nitrogen Rate	Days to Silk	Ear Height	Plant Height	Harvest Moisture	Seed Protein @ 0% Moisture	Starch Content @ 0% Moisture	Test Weight	Grain Yield
lb/ac		inch			%		lb/bu	bu/ac
0	88.8	39.2	94.3	24.2	11.0	68.2	53.3	140
50	89.8	39.4	96.9	23.0	11.1	67.1	52.7	140
100	88.0	38.2	94.1	22.5	11.1	68.2	55.0	143
150	89.5	39.2	96.5	22.0	11.2	68.0	54.5	142
50 + Nutrisphere-N	88.3	39.2	97.6	23.7	11.3	68.8	55.1	141
100 + Nutrisphere-N	89.0	39.6	97.8	21.8	11.3	67.9	54.9	146
50 / AgBlend	88.5	39.0	95.7	22.8	11.2	68.3	53.9	155
100 / AgBlend	88.8	40.6	98.6	22.6	11.2	67.5	54.1	148
50 / SoilBuilder	89.3	38.4	97.8	22.5	11.3	68.4	54.4	142
100 / SoilBuilder	89.3	38.2	97.8	23.1	11.3	68.2	54.5	137
LSD (P=.05)	NS	NS	NS	NS	NS	NS	1.4	NS
CV	1.11	6.15	2.79	5.95	1.84	1.16	1.78	10.91
Grand Mean	88.9	39.1	96.7	22.8	11.2	68.1	54.3	143
Treatment Prob(F)	0.2993	0.9470	0.2567	0.3815	0.2329	0.2154	0.0333	0.9146

Table 3. 22-inch row dryland corn response to nitrogen.

Nitrogen Rate	Days to Silk	Ear Height	Plant Height	Harvest Moisture	Seed Protein @ 0% Moisture	Starch Content @ 0% Moisture	Test Weight	Grain Yield
lb/ac		inch			%		lb/bu	bu/ac
0	88.0	37.2	90.0	20.6	10.8	70.6	55.5	117
50	87.5	39.4	90.2	21.5	11.0	70.3	55.6	124
100	87.8	40.4	91.7	20.1	11.2	69.7	56.1	139
150	88.3	39.8	91.1	19.5	11.2	70.0	55.6	134
LSD (P=.05)	NS	NS	NS	1.1	NS	NS	NS	NS
CV	0.95	3.79	1.85	3.24	2.33	0.61	1.26	10.35
Grand Mean	87.9	39.2	90.8	20.4	11.1	70.1	55.7	129
Treatment Prob(F)	0.6310	0.0661	0.4402	0.0231	0.1745	0.0916	0.6903	0.1744

Table 4. 22-inch row irrigated corn response to nitrogen.

Nitrogen Rate	Days to Silk	Ear Height	Plant Height	Harvest Moisture	Seed Protein @ 0% Moisture	Starch Content	Test Weight	Grain Yield
lb/ac		inch		%			lb/bu	bu/ac
0	91.3	39.8	96.5	24.9	10.6	68.9	51.3	143
50	90.3	41.5	96.3	24.0	10.8	68.8	49.8	162
100	89.8	41.3	98.2	24.0	10.7	68.5	53.1	158
150	90.0	42.9	101.6	23.0	10.8	68.8	53.6	151
LSD (P=.05)	NS	NS	NS	NS	NS	NS	NS	NS
CV	0.74	5.19	2.67	6.45	3.8	0.77	8.22	9.11
Grand Mean	90.3	41.4	98.1	24.0	10.7	68.8	52.0	153
Treatment Prob(F)	0.0510	0.2946	0.0618	0.4203	0.7939	0.6752	0.6003	0.2892

Corn response to N fertility.