

**Corn Response to Nitrogen
NDSU Carrington Research Extension Center
2009**

Experiments were conducted at the Carrington Research Extension Center in 2009 to evaluate corn response to nitrogen (N) rates. Conventional tillage practices were used in the 22 inch row irrigated and dryland trials and 30 inch row irrigated trial. The 30 inch row dryland trial was direct seeded. A fall 0-2 foot soil test indicated 22 lb N/ac at the irrigated site. A spring 0-4 foot soil test indicated 13 lb N/ac in the 0-2 foot zone and 40 lb N/ac in the 2-4 foot zone at the dryland site. DKC 35-19' corn was sown May 14 in 30-inch rows at 26,400 pure live seeds/acre and May 20 in 22-inch rows at 36,000 pure live seeds/acre. In the 30-inch row corn trials the experimental design was a split plot with N source (urea and polymer coated urea) as the main plot and N rates (0, 50, 100, and 150 lb N/acre) as the sub plot. The polymer coated urea was Nutrisphere-N (NSN) from Simplot. A randomized complete block design was used in the 22-inch row corn trials. The N rates evaluated were 0, 50, 100, and 150 lb N/acre. The trials were harvested Nov 18-25.

No interactions were detected among treatments (data not shown). In the 30 inch-row corn trials, the NSN plots had reduced ear heights at the dryland site (table 1). At the irrigated site the NSN plots had higher grain moisture and lower grain yield. For both the dryland and irrigated 30-inch row trials and the irrigated 22-inch row trial, grain yield increased as the fertilizer rate increased to 50 lb/ac then leveled off (table 2, 3, and 5). Grain yields were low in the 22-inch row dryland trial and did not respond to the N rates evaluated (table 4).

Table 1. 30 inch row corn response to N source material, averaged over N rates.

	Dryland	Irrigated	
N source material	Ear Height	Harvest Moisture	Grain Yield
	inch	%	bu/ac
Urea	28.6	22.1	132
NSN	27.7	23.1	125
LSD 0.05	0.7	0.9	6

Table 2. 30-inch row dryland corn response to nitrogen, averaged over N source.

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	86.8	26.9	74.2	22.9	8.8	70.2	51.2	74
50	85.4	28.7	79.4	22.9	10.6	68.9	51.0	95
100	86.8	28.5	81.2	25.0	11.4	68.6	48.7	97
150	86.1	28.4	80.9	25.0	11.7	68.6	49.0	104
LSD 0.05	NS	1.0	2.8	NS	0.4	0.6	1.5	14

Table 3. 30-inch row irrigated corn response to nitrogen, averaged over N source.

Nitrogen Rate	Days to Silk	Ear Height	Plant Height	Harvest Moisture	Seed	Starch	Test Weight	Grain Yield
					Protein @ 0% Moisture	Content @ 0% Moisture		
lb/ac		inch			%		lb/bu	bu/ac
0	84.4	33.7	90.9	22.6	10.4	68.2	52.0	112
50	84.6	34.5	95.3	22.2	11.2	67.9	51.2	133
100	84.8	35.0	97.1	22.3	11.5	67.5	51.1	134
150	84.9	36.1	96.9	23.3	11.8	67.5	50.5	137
LSD 0.05	NS	1.7	3.2	NS	0.52	NS	0.8	9

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

Nitrogen Rate	Days to Silk	Ear Height	Plant Height	Harvest Moisture	Seed	Starch	Test Weight	Grain Yield
					Protein @ 0% Moisture	Content @ 0% Moisture		
lb/ac		inch			%		lb/bu	bu/ac
0	84.5	27.2	73.2	26.3	8.9	70.2	49.0	61
50	83.8	28.0	77.4	28.6	9.6	70.3	48.0	69
100	84.0	28.5	78.9	32.2	10.6	69.3	47.5	72
150	84.5	29.5	80.5	33.5	10.9	69.6	47.3	72
LSD 0.05	NS	NS	3.6	3.6	0.8	NS	NS	NS

Table 5. 22-inch row irrigated corn response to nitrogen.

Nitrogen Rate	Days to Silk	Ear Height	Plant Height	Harvest Moisture	Seed	Starch	Test Weight	Grain Yield
					Protein @ 0% Moisture	Content @ 0% Moisture		
lb/ac		inch			%		lb/bu	bu/ac
0	88.8	33.5	89.8	27.5	9.9	68.4	48.9	116
50	88.3	35.0	92.7	27.5	10.1	68.6	47.7	138
100	88.8	35.2	97.4	27.5	10.9	68.1	48.2	143
150	88.3	36.8	99.8	28.9	11.2	67.9	48.2	145
LSD 0.05	NS	1.9	4.9	NS	0.4	NS	NS	17