

Corn Performance with Tillage Systems and Fertilizer Placement, Carrington, 2009.

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A field study was conducted at the NDSU Carrington Research Extension Center to examine the performance of corn under several tillage systems and fertilizer placement options. Experimental design was a randomized complete block with four replications. The previous crop was wheat and fall standing stubble was 9- to 12-inches tall. The dryland trial was established on a Heimdal-Emrick loam soil with 3.6% organic matter, 6.3 pH, and phosphorus at 9 ppm (med). Fall strip-till treatments were imposed on October 31, 2008 using a Yetter strip-till opener with 30-inch row spacing using a 5- to 6-inch tillage depth that established a berm 8- to 10-inches wide. Conventional-till plots were tilled on October 30 using a cultivator plus spring harrow and roto-tilled on May 11, 2009 at a 4-inch depth. DeKalb Roundup Ready 'DKC35-19' was planted at 26,000 seeds/A with a John Deere 71 4-row flex planter in 30-inch rows on May 19. 10-34-0 was applied at 6 gal/A. Soil moisture and temperature sensors were used to monitor these factors in the three tillage systems (data not shown). Plant stand counts were taken on June 10. Conventional-till plots were cultivated between crop rows on July 3. The seed was harvested with a plot combine on November 18.

Crop residue levels taken after corn planting using the line-transect method indicated the highest level with no-till and 66-73% with strip till (Table). No-till plant emergence and silk dates were delayed 1 to 4 days compared to other tillage systems. Plant stand was similar among treatments while height was highest with strip till and in-furrow placement of fertilizer. Grain yield and quality generally were similar among treatments, although moisture was less with the strip till/in-furrow treatment. However, seed yield tended to be higher with strip till/fall deep band and lower with strip till/in-furrow treatments. Also, protein and starch tended to be lower and test weight higher with the strip till/in-furrow compared to other treatments.

Tillage system/ fertilizer placement	Crop residue %	Plant ¹						Seed				
		Emerge	Stand	(26- Jun)	Silk	Green color (NDVI)		Yield	Test weight	Moisture	Protein	Starch
		Jday	plt/A	inches	Jday	16-Jul	3-Aug	lb/A	lb/bu	%		
Conventional/band	8	152	31210	18	222	0.78	0.78	94.7	51.4	22.0	10.4	69.1
No-till/band	84	153	30545	17	223	0.71	0.75	93.4	50.2	22.1	10.1	69.5
Strip till/band	66	152	31210	16	222	0.73	0.77	90.8	51.3	21.5	9.4	69.8
Strip till/in-furrow	73	152	29215	22	219	0.75	0.77	88.0	52.9	19.6	7.7	51.8
Strip till/fall deep band	69	151	33535	15	222	0.71	0.75	102.2	51.9	20.8	10.5	69.1
Strip till	69	152	29550	16	222	0.72	0.75	94.0	51.3	20.4	9.9	70.0
mean	61	152	30880	17	222	0.73	0.76	93.9	51.5	21.1	9.7	66.5
CV (%)	7.5	0.2	12.5	6.4	0.3	2.7	4	4.2	2.7	4.2	21.9	21.2
LSD (0.05)	7	1	NS	2	1	0.05	NS	NS	NS	1.3	NS	NS

¹Stand counts taken on June 10; Height measured on June 26; Green color data taken with GreenSeeker.