# Corn Performance with Tillage Systems, Fertilizer Placement and Row Spacing, Carrington

Greg Endres, Steve Schaubert, Blaine Schatz and Mike Ostlie

A field study continued at the NDSU Carrington Research Extension Center to examine the performance of corn with several tillage systems, starter fertilizer placement methods and row spacings. Experimental design was a randomized complete block with split-plot arrangement (whole plot = two row widths and split plots = three tillage systems and four fertilizer application methods) with four replications. The dryland trial was established on a Fram-Wyard loam soil with 3.8 percent organic matter, 7.8 pH, and phosphorus at 6 ppm (low). The previous crop was barley and fall standing stubble was 4- to 12-inches tall. Fall strip-till treatments were imposed on October 31, 2011, using a Yetter strip-till opener with 22- and 30-inch row spacing using a 5-inch tillage depth that established a berm 10-inches wide. Conventional-till plots were roto-tilled at a 3-inch depth on October 31, 2011, and tilled on April 19, 2012, using a cultivator plus spring harrow. DeKalb 'DK33-53' Roundup Ready corn was planted with a John Deere 71 4-row flex planter on April 24. Light hail damage occurred to the trial on August 24. Grain was harvested with a plot combine on October 3.

Crop residue levels taken after corn planting using the line-transect method averaged 50 percent with no-till (direct seed), 37 percent with strip till and 8 percent with conventional till. Plant stand averaged 29,625 plants/acre across the trial (Table). Plant emergence and silk dates were delayed one day, crop height was about 4 inches taller, and seed yield was 10.5 bu/A greater with 22-inch vs. 30-inch rows.

Averaged across row spacings, plant stand with 12 gpa of in-furrow applied 10-34-0 was reduced 27 percent compared to the untreated strip-till check. Grain yield and quality generally were similar among tillage and fertilizer treatments. However, yield tended to be higher with direct-seeded and strip till with 2x0" banded fertilizer. Also, test weight generally improved with starter fertilizer compared to the untreated check.

**Corn response to tillage, starter fertilizer and row spacing. Strip till, 22-inch rows, in furrow treatment, left, vs. conventional till, 22-inch rows, 2 x 0 band fertilizer (right), July 3, 2012.**

**Table. Corn response to tillage system, placement of starter fertilizer and row spacing, Carrington, 2012.**

| | Plant | | | | Seed | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Treatment[1] | Emerge | Silk | Stand (May 31) | Height (July 3) | Yield | Test Weight | Moisture | Protein | Starch |
| | Jday | | plt/A | cm | bu/A | lb/bu | | % | |
| Row spacing (inches): | | | | | | | | | |
| 22 | 137 | 202 | 29,032 | 91 | 207.8 | 57.8 | 15.3 | 8.5 | 72.4 |
| 30 | 136 | 201 | 30,213 | 101 | 197.3 | 58.0 | 15.2 | 8.4 | 72.7 |
| LSD (0.05) | 1 | 1 | NS | 7 | 7.0 | NS | NS | NS | NS |
| Tillage system and placement of starter fertilizer: | | | | | | | | | |
| CT and 2x0" band at 12 gpa | 136 | 201 | 28,821 | 101 | 201.9 | 58.0 | 15.1 | 8.5 | 72.6 |
| NT and 2x0" band at 12 gpa | 136 | 202 | 28,957 | 97 | 208.7 | 57.9 | 15.4 | 8.5 | 72.5 |
| ST and 2x0" band at 12 gpa | 136 | 202 | 32,669 | 99 | 208.6 | 57.8 | 15.3 | 8.4 | 72.8 |
| ST and IF at 12 gpa | 137 | 201 | 23,856 | 99 | 201.8 | 58.3 | 15.1 | 8.5 | 72.7 |
| ST and fall DB at 12 gpa | 136 | 202 | 30,948 | 83 | 203.4 | 57.6 | 15.4 | 8.5 | 72.5 |
| ST and fall DB at 6 gpa/ IF at 6 gpa | 136 | 200 | 29,364 | 101 | 190.3 | 58.4 | 15.1 | 8.5 | 72.4 |
| ST | 136 | 203 | 32,745 | 92 | 202.9 | 57.2 | 15.5 | 8.4 | 72.4 |
| LSD (0.05) | 1 | 1 | 4,750 | NS | NS | 0.5 | NS | NS | NS |
| Mean | 136 | 201 | 29,625 | 96 | 203 | 57.9 | 15.3 | 8.5 | 72.6 |
| C.V. (%) | 0.3 | 0.7 | 15.9 | 13.8 | 6.5 | 0.9 | 2.3 | 3.4 | 0.9 |

[1]CT = conventional till; NT = no-till (direct seed); ST = strip till. Starter fertilizer = 10-34-0; DB = deep band; IF = in-furrow.