# Sugarbeet Hybrid-Tillage Study

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Sugarbeet stand establishment can be a difficult proposition. Generally, dryland beets are planted into a well worked, firm, level seedbed to maintain accurate depth control and seed spacing into moist soil. This results in a very smooth surface that is susceptible to wind erosion. The emerging plants and seedlings are easily cut off by blowing soil. Wind can cause the young seedlings to spin out of the ground, called helicoptering. In either event, replanting is required. The replanting is not only expensive but results in lost growing time which is important to maximize yield. Strip-till is a procedure used by producers to protect the plants from wind. Narrow black strips that match the row width of the planter are made in the fall on previous small grain or other suitable crop stubble. The strips are made with a knife that works and lifts the soil. Berm builders, coulters that contain the soil coming off the knife, make a berm. Some strip-till machines use angled fluted coulters to till the strip and form a berm. The width of the black strips vary with the machine used but typically are about 6 inches wide. The planter units plant on the tilled black strips from the previous fall. The un-worked stubble in between the strips acts as a wind buffer to protect the seedlings from wind damage.

The objectives of this study were to determine if viable sugarbeet stands can be established in strip-till zones and how beet yields compare between the conventional and strip-till. Another objective was to show the advantages of irrigation to keep the small shallow seeds moist during germination and seedling growth.

## Materials and Methods

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|---|---|
| Soil: | Embden sandy loam and Hecla sandy loam; soil-N 47 lbs/ac; soil-P and soil-K were very high; soil-S was low. |
| Previous crop: | 2007 – barley; 2006 – onion; 2005 – field corn. |
| Seedbed Preparation: | Strip-till: Strip-tilled April 18 using a narrow, shark-toothed residue manager with an anhydrous point on the shank and 13-inch fluted closing coulters. This configuration, with minimal angle (less aggressive) on the coulters, tilled a 6-inch non-bermed band in the soil.<br>Conventional: Rototilled May 5. |
| Planting: | Planted on May 5 in 22-inch rows at 120,000 seeds per acre and were later thinned to 47,500 plants per acre. |
| Plots: | Plots were 17 ft. long by 7⅓ ft. (4 rows) wide, with a 2⅔ ft. tilled border between plots. There were four replications. |
| Fertilizer: | At tillage applied 12 lbs. N/acre and 40 lbs. $P_2O_5$/acre as 10-34-0. Stream-bar applied 90 lbs. N/acre on June 16 and 30 lbs. N/acre on July 10 as 32-0-0. This practice would not be recommended under field conditions as severe leaf burn could occur. We were able to limit leaf burn by irrigating immediately after N application. |
| Irrigation: | Overhead sprinkler irrigation as needed. |
| Pest control: | Weeds were controlled with Upbeet (½ oz/acre) + Betamix (¾ pt/acre) + NIS (0.25%v/v) on May 20, Upbeet (½ oz/acre) + Betamix (1.5 pt/acre) on May 28, Nortron (4 oz/acre) + Betamix (1.5 pt/acre) on June 4, Nortron (4 oz/acre) + Betamix (2 pt/acre) on June 24, Select 2E (8 oz/acre) + COC (1.0% v/v) on July 1 and by hand weeding. For disease control; Eminent (13 oz/acre) on July 18 and August 15 and Headline (12 oz/acre) on July 31. |
| Harvest: | Harvested on October 16. Harvest area was 17 feet of the center two rows. The beets were mechanically topped and lifted, then handpicked, counted, and weighed. A sample from each plot was taken for analysis. |

**Results**

Yield between strip-till and conventional tillage wasn't significantly different. Established populations for conventional tillage and strip-till were 45,540 and 42,454 plant/ac, respectively. This population difference was not significant. Sugar percent and recoverable sugar lb/ton were significantly higher in the conventional tillage.

**Table 1. Sugarbeet hybrid tillage study at the Oakes Irrigation Research Site in 2008.**

| Tillage | Yield | Sugar | Sugar Loss | Recoverable Sugar | Recoverable Sugar | Sodium | Potassium | Amino-N |
|---|---|---|---|---|---|---|---|---|
| | ton/ac | % | % | lb/ton | lb/ac | ppm | ppm | ppm |
| Strip-till | 39.5 | 17.0 | 1.4 | 339 | 13376 | 82 | 2074 | 485 |
| Conventional | 41.2 | 17.2 | 1.4 | 344 | 14159 | 80 | 1976 | 496 |
| Mean | 40.3 | 17.1 | 1.4 | 342 | 13768 | 81 | 2025 | 490 |
| C.V.% | 5.8 | 0.9 | 4.5 | 0.9 | 0.1 | 14.3 | 3.9 | 5.7 |
| LSD.05 | NS | 0.2 | NS | 4 | NS | NS | NS | NS |

| Hybrid | Yield | Sugar | Sugar Loss | Recoverable Sugar | Recoverable Sugar | Sodium | Potassium | Amino-N |
|---|---|---|---|---|---|---|---|---|
| | ton/ac | % | % | lb/ton | lb/ac | ppm | ppm | ppm |
| Crystal R434 | 39.2 | 17.2 | 1.5 | 343 | 13448 | 95 | 2172 | 552 |
| 1305R | 39.4 | 17.0 | 1.4 | 340 | 13364 | 75 | 1981 | 475 |
| SU46519 | 42.5 | 17.1 | 1.3 | 341 | 14491 | 72 | 1922 | 444 |
| C.V.% | 9.3 | 1.7 | 6.2 | 1.8 | 0.1 | 23.2 | 4.5 | 10.3 |
| LSD.05 | NS | NS | 0.1 | NS | NS | NS | 99 | 55 |

| | Yield | Sugar | Sugar Loss | Recoverable Sugar | Recoverable Sugar | Sodium | Potassium | Amino-N |
|---|---|---|---|---|---|---|---|---|
| | ton/ac | % | % | lb/ton | lb/ac | ppm | ppm | ppm |
| Strip-till, R434 | 38.3 | 17.1 | 1.5 | 342 | 13079 | 101 | 2205 | 534 |
| Conventional, R434 | 40.1 | 17.2 | 1.5 | 345 | 13817 | 90 | 2140 | 571 |
| Strip-till, 1305R | 37.9 | 17.0 | 1.4 | 339 | 12834 | 74 | 2041 | 476 |
| Conventional, 1305R | 40.8 | 17.0 | 1.3 | 341 | 13895 | 77 | 1921 | 474 |
| Strip-till, SU46519 | 42.2 | 16.9 | 1.3 | 337 | 14216 | 72 | 1977 | 444 |
| Conventional, SU46519 | 42.8 | 17.3 | 1.3 | 346 | 14766 | 73 | 1867 | 443 |
| C.V.% | 9.4 | 1.7 | 6.2 | 1.8 | 0.1 | 23.2 | 4.5 | 10.3 |
| LSD.05 | NS | NS | NS | NS | NS | NS | NS | NS |