2022 Winter Tomato Trial: Till No-Till Comparison

Compiled By: Asher Whitney, Undergraduate Research Assistant, Oregon State University

Brief Background:

A Winter tomato variety trial was conducted in 2021 to evaluate the potential for this market class to be dry farmed commercially in Oregon. These varieties are unique, because they have been found to store fresh through the winter. At the 2021 and 2022 Dry farmed Tomato Fest at Wellspent Market in Portland, OR, community members showed a strong interest in buying ristras of these varieties (see Images 1-5). As a continuation of this work, five of the top-performing varieties in terms of yield, storage, and/or flavor were grown in 2022 in an un-replicated till/no-till comparison trial (see Table 1).

Variety trial results can be found here:

https://smallfarms.oregonstate.edu/sites/agscid7/files/smallfarms/2021_winter_tomato_vareity_trial_report_final.pdf and **https://www.youtube.com/watch?v=8ncEQL8y76o&t=3s** **.**

Takeaways:

This year due to the late season moisture planting was delayed until May 31. Fruit in the No-Till plot ripened about a week later than the Tilled Plot (see Figure 2 and 3). This along with late planting seemed to cause a large reduction in harvest for the late producing Petit del Ramallet in the No-Till Plot. Piennolo Giallo stood out for its sweetness (see Image 1). Mala Cara with its matte skin and light red color is also a crew favorite (see Image 5). The only variety that had any blossom end rot this year was Mala Cara. Piennolo Giallo, Piennolo de Vesuvio and Petit del Ramallet had some splitting by mid-September. Overall, the Tilled plot yielded higher than the No-Till plot.

Site Description:

Oak Creek Center for Urban Horticulture lies along a riparian zone on the outskirts of OSU's Corvallis Campus, this site is unique for its microclimate. The field has a wind break to the west. The site receives an average annual precipitation of 49 inches, with July as the driest month. The soil type has been identified as a Woodburn silt-loam soil, which may be one of the best soils in the Willamette Valley for dry farming.

Soil Preparation and Methods:

- Tilled: The winter cover crop was mowed in May. Lime, pelletized chicken manure, and compost based were applied based on soil test results. The amendments and cover crops were then incorporated into the top 6-8 inches of the soil with a tiller.
- No-Till: The soil was amended with lime, pelletized chicken manure a followed by a layer compost, cardboard mulch and bark chips on top to reduce weed pressure and evaporation of soil moisture.

There were two plots, one tilled and one not tilled. In each plot there were five randomized subplots one for each variety. Plants were planted in trays in the greenhouse early April. Plants were transplanted deeply (leaving 3-4 leaflets above ground) in the field on May 31, 2022.

Eight Watermark sensors were placed in each plot during a previous growing season, at depths 1, 2, 3, and 4 feet (two sensors per depth – A & B); tomatoes were planted in line with the sensors. Sensor readings were taken weekly from time of transplant to final harvest. Plants were spaced to have a minimum of 15 sq ft each. Weeds were managed weekly with tools including a wheel hoe and hula hoe in the Tilled plot and by hula hoe and hand in the No-Till plot. Once fruit ripened harvests and yield data started once a week. After the harvest yield data was collected by taking the mass of unblemished fruit and blemished fruit for each subplot. Unblemished fruit were fruit found to be free of blossom end rot, sunburn, and splitting.

Table 1: Variety Descriptions, observations and varietal code used on Figures.

Variety	Code	Description and Observations
Mala Cara	MC	Round, medium fruit with a matte dull red, almost pink, skin. These are a later season indeterminate variety with potato leaves. They are susceptible to blossom end rot. The variety could benefit from trellising.
Petit del Ramallet	PR	Small to medium orange fruit with a pointed blossom end. This is a later season variety. Best harvested when the fruit is orange if harvested later the fruit is susceptible to splitting. This variety would be much easier to harvest if it were trellised, due to the large and sprawling fruit clusters.
Piennolo del Vesuvio	PV	Small red pear-shaped with a pointed blossom end. This is early to mature variety and would be much easier to harvest if trellised. Best eaten lightly cooked after two or more weeks of storage to allow for flavor to develop.
Piennolo Giallo	PG	Small yellow pear-shaped, with a pointed blossom end. This is an early to mature variety and would be much easier to harvest if trellised. Flavor develops one to two weeks post-harvest and is on the sweeter side.
Annarita	ANN	Small round fruit in neat bunches, ranging from orange to red color at harvest. They have a distinct flavor and tend to be used in fish stews.

Results:

Plants in the No-Till plot on average produced harvestable fruit a week later than the Tilled plot (see Figures 2 and 3). In the Tilled plot Petit del Ramallet ripened three weeks prior to the No-till Plot, though harvests were relatively small until the final harvest at the end of September. Petit del Ramallet, Piennolo del Vesuvio, and Piennolo Giallo all yielded more in the Tilled plot. Annarita yielded more in the No-Till plot, producing 15 lbs. more fruit than the Tilled plot. Mala Cara preformed similarly in both plots, with the Tilled plot producing less than 5 lbs. more fruit (see Figure 1).

Through the season available soil moisture steadily decreased, this was associated with an increase in soil water tension (see figures 4-7). As the tension goes up water is more tightly held

to the soil, limiting plant access. The first two feet of soil saw the most variability in tension through the season. There were no clear differences in soil water tension between the Tilled and No-Till plots. During the beginning of the season the soil was well saturated leading to low measurements of tension from June to late July (see Figures 4 and 5). At three and four feet the measurements across plots overall did not vary greatly. Soil moisture at three and four feet started to decrease around mid-August (see Figures 6 and 7).

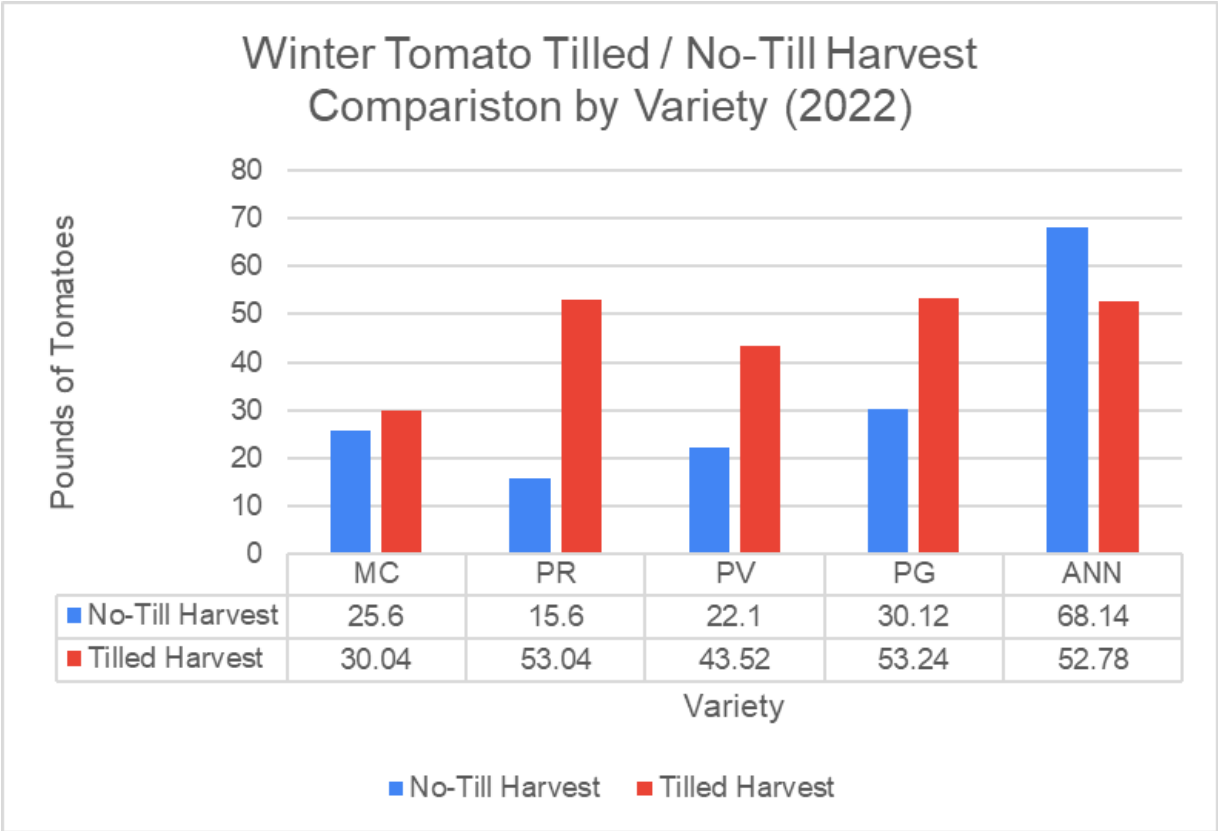

Figure 1 This Figure compares total marketable yield of winter tomatoes the Tilled and No-Till plots by variety. See Table 1 for variety code.

Image 1, 2, & 3: Left-Piennolo Giallo ristra hanging for storage in a home (Photo: Asher Whitney). Middle- Piennolo del Vesuvio ristra (Photo: Amy Garrett) Right- Annarita ristra (Photo: Asher Whitney).

Images 4 & 5: Left-Petit del Ramallet ristra (Photo: Amy Garrett), Right- Mala Cara ristra (Photo: Asher Whitney).

Tomato Yields:

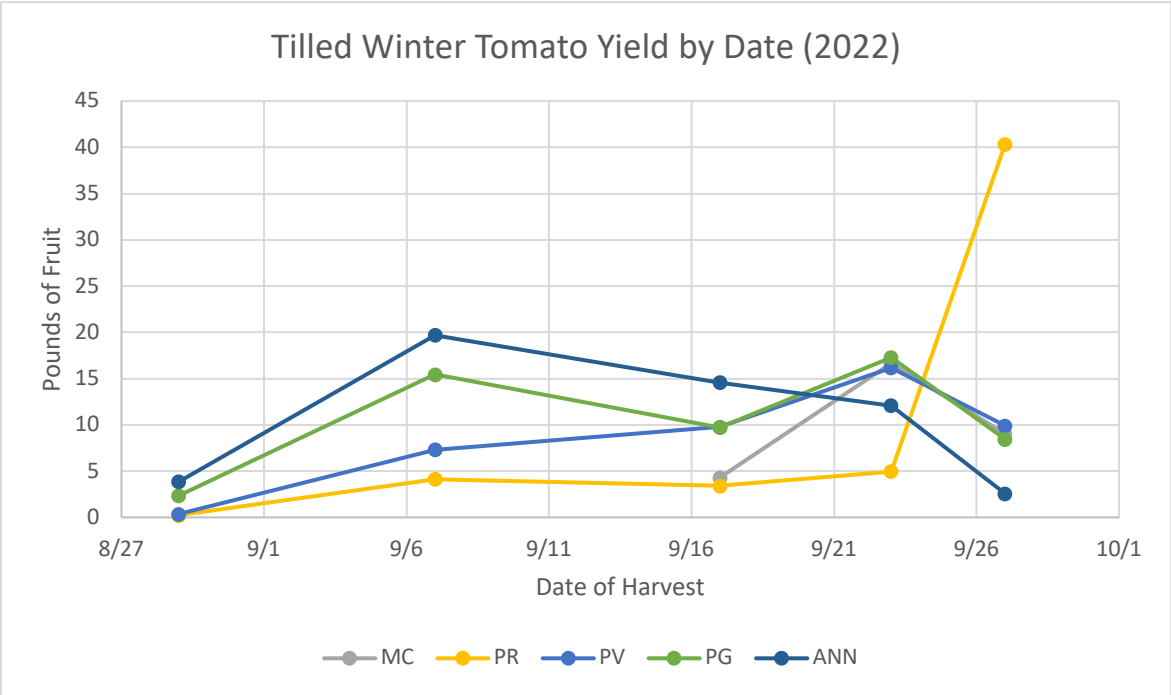

Figure 2: This shows harvest data for winter tomatoes in pounds by variety, for the tilled plot, starting on 8/29/22 through 9/27/22. See Table 1 for variety code.

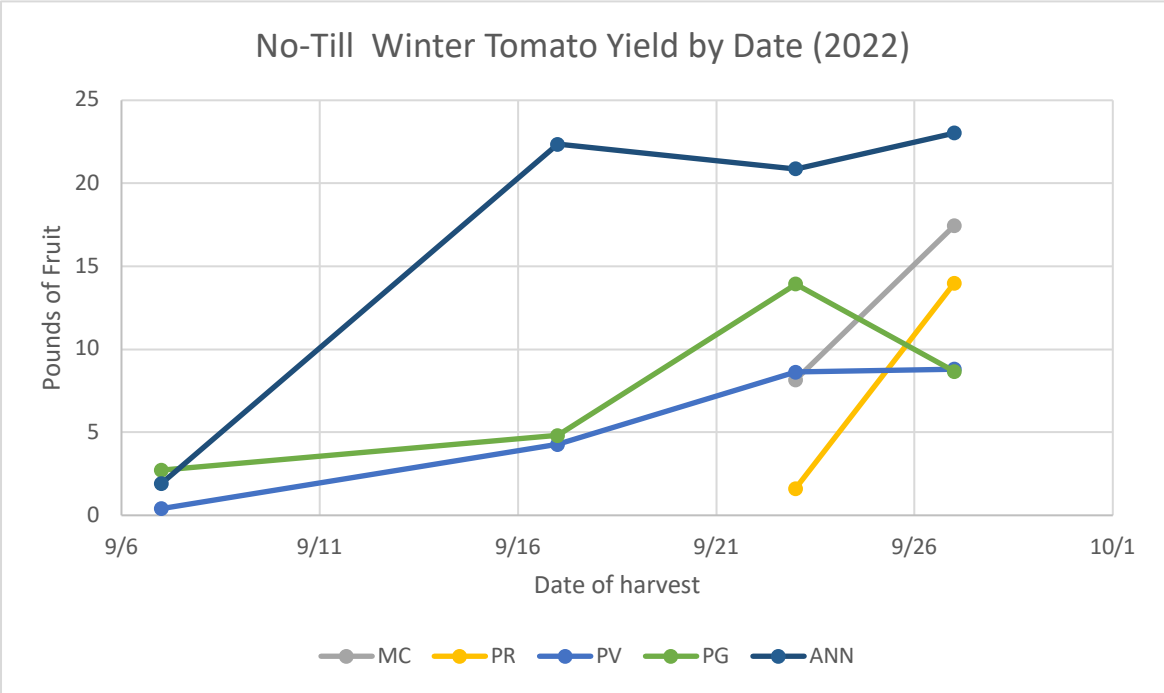

Figure 3: This shows harvest data for winter tomatoes in pounds by variety, for the no-till plot, starting on 9/7/22 through 9/27/22. See Table 1 for variety code.

Soil Water Tension:

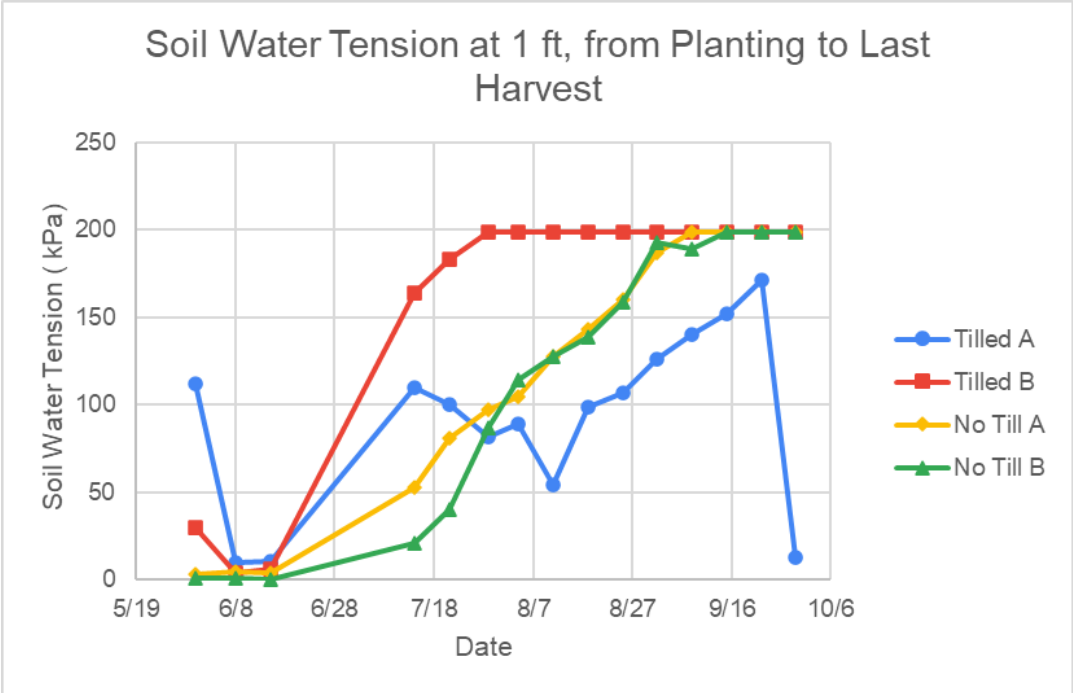

Figure 4: This shows the change in soil water tension at 1 ft, from two sensors (A & B), through the growing season for the winter tomato till, no-till comparison.

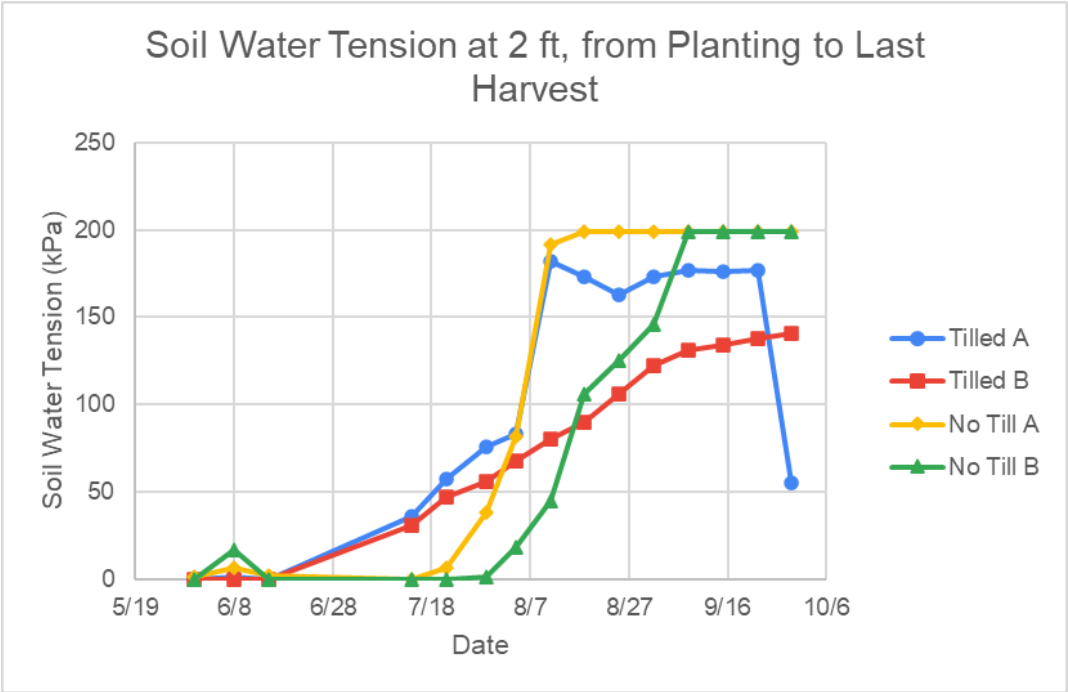

Figure 5: This shows the change in soil water tension at 2 ft, from two sensors (A & B), through the growing season for the winter tomato till, no-till comparison.

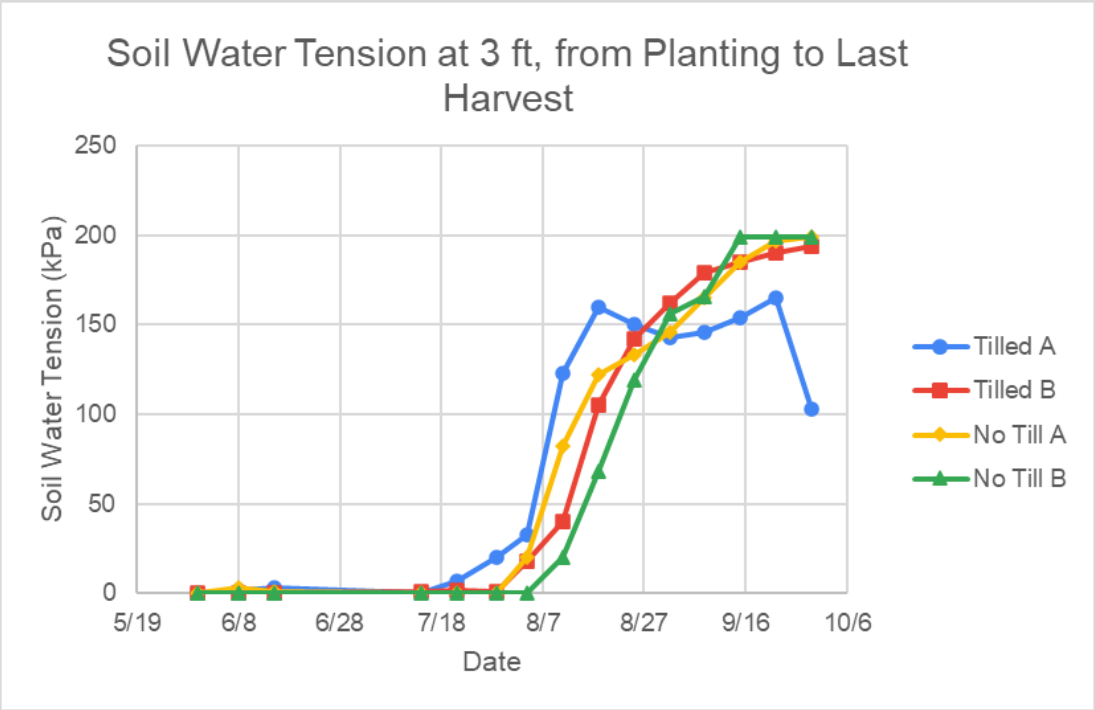

Figure 6: This shows the change in soil water tension at 3 ft, from two sensors (A & B), through the growing season for the winter tomato till, no-till comparison.

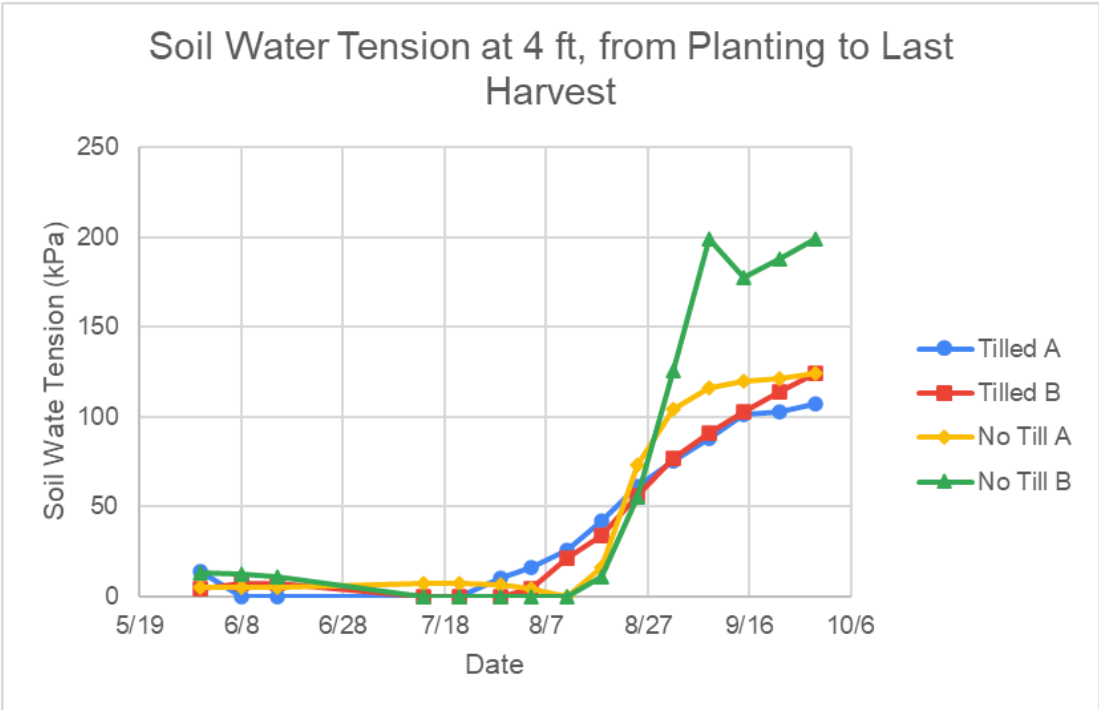

Figure 7: This shows the change in soil water tension at 4 ft, from two sensors (A & B), through the growing season for the winter tomato till, no-till comparison.