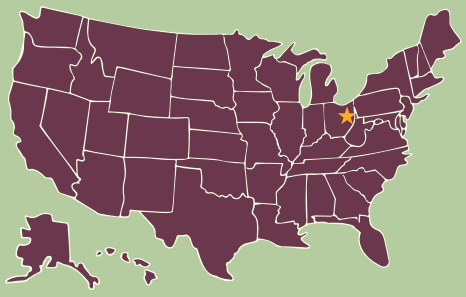
ORGANIC FARMING RESEARCH FOUNDATION

Farmer-Led Trials: Comparing Mulch Types on an Urban Farm in Transition



2025

Farmer-Researcher:
Markisha Parker,
Parker Farm
Warren, OH

IN A NUTSHELL

Parker Farm, an urban farm in Warren, Ohio, compared the effects of different organic mulches – straw, grass clippings, and wood chips against a bare-soil control on slicer tomato yield and marketability. In the trial, all organic mulches significantly improved yield compared to bare soil, with straw mulch and grass clippings leading to the highest marketable yields. Straw was identified as the preferred mulch due to its excellent long-term weed suppression and moisture retention, which minimized labor and mitigated disease vulnerability.

ABOUT THE FARM

Parker Farm, located in Warren, Ohio, is a small farm with a big heart, committed to serving their community with sustainable, urban agriculture. The farm provides fresh, locally-grown produce through wholesale partnerships with food banks and community programs, supporting local food security. Markisha Parker, owner and founder, specializes in sustainable urban farming and organic production and is in her second year of transitioning to certified organic.

Markisha Parker, Parker Farm

Her urban farm spans multiple sites totaling approximately one acre with areas dedicated to cultivating native plants, vegetables, and fruits, allowing Parker Farms to grow their impact and bridge the gap between urban gardening and farming. Markisha's most valuable crop is tomatoes, but the farm's mission extends much further: to empower others in agriculture by offering resources and support to help gardeners build successful commercial farming enterprises. While Markisha has done field trials in the past, she was looking for an opportunity to have support in improving her processes and systems on the farm.

Flowering tomato plants with straw mulch.

To deal with excess moisture on her farm, Markisha tested mulches that were readily available to her on her tomato plants:

- *Straw from a neighboring farm.*
- *Grass clippings from area around Parker Farms.*
- *Aged wood chips.*
- *Bare soil control group.*

WHAT WAS THE ON-FARM TRIAL ABOUT?

With limited space in an urban environment, Markisha wanted to improve the yields and systems in the area that they already have in production.

Markisha in her trellised tomato plots.

In previous seasons, Markisha had issues with excess moisture and puddling in the fields. One of her biggest challenges was in her most valuable crop: tomatoes. Episodes of excess rain left much of her crop with splitting or blight.

In order to address these issues, she wanted to trial different readily available materials that could be used as a mulch, in order to mitigate extreme rainfall events and help her tomatoes get to market. In her area, Markisha had access to local sources of woodchips, grass clippings, and straw.

With technical support from OFRF, Markisha set up a trial to compare how three mulch materials (straw, grass clippings, and woodchips) impact the yield and marketability of slicer tomatoes, and compare it to a control group with no mulch.

HOW WAS THE TRIAL DONE?

The trial was designed as a randomized complete block with 4 replications (Figure1). The tomatoes were started from seed and transplanted to the plots in late May; each plot contained 5 tomato plants.

Mulch treatments were applied following planting. Mulch treatments (aged wood chips, straw from a neighboring farm, and fresh grass clippings from areas around her farm) were applied at an approximate 2" depth. The control plot had no mulch added, and was left as bare soil.

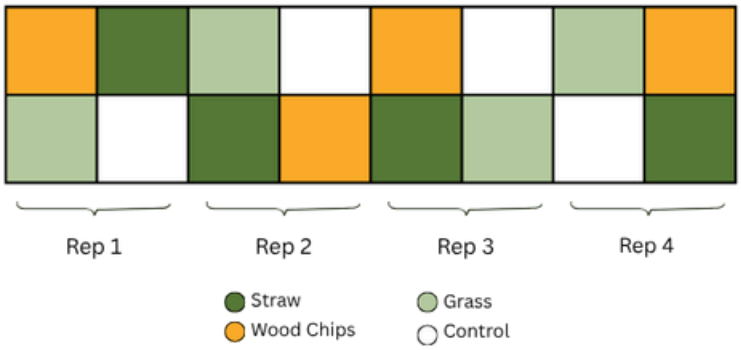


Figure 1. Plot map showing the trial layout at Parker Farm.

Markisha took measurements of yield and marketable yield at each tomato harvest. The first harvest was on July 6th, and she harvested every week until October 5th.

Control group tomatoes planted in bare soil.

FINDINGS

All three mulch treatments improved yield compared to the bare-soil control. The straw mulch treatment showed the highest final yield of 481 lbs total marketable yield, followed by the grass mulch which was not significantly different from the outcome of the straw treatment (Figure 2). Both the straw and grass treatments performed better than the wood chip treatment and the control.

The wood chip mulch resulted in statistically significant improvements in yield over the control plot of bare soil. Additionally, the control plots showed the lowest yield and were the most labor-intensive, demanding the greatest time investment for weekly weeding.

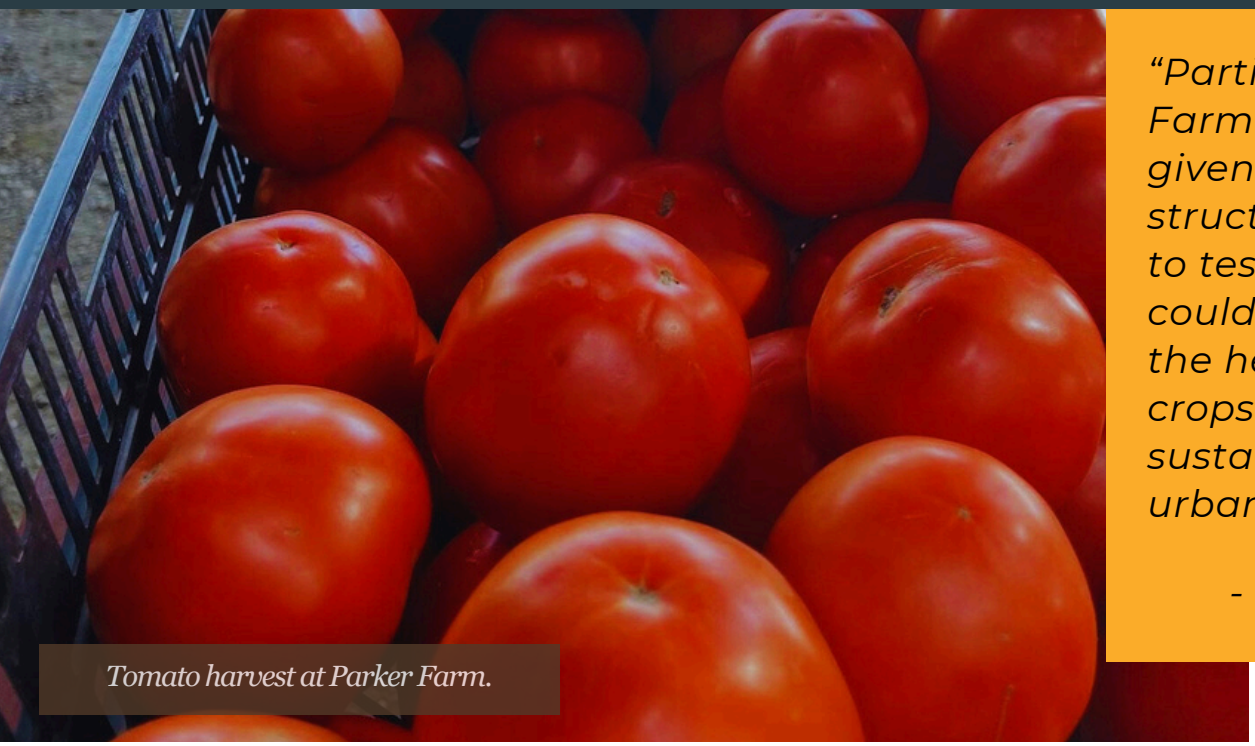
Transplanting and Mulching

First Harvest

Yield measured

Data analyzied

MAY JULY OCTOBER DECEMBER



Tomato harvest at Parker Farm.

"Participating in the Farmer Led Trials has given me the structure and support to test practices that could improve both the health of my crops and the sustainability of my urban plots"

- Markisha Parker

A key finding across all four treatments was the remarkable consistency in the quality of the harvest. Marketable yield, defined as produce meeting size and appearance standards, consistently fell within a tight range of 78% to 82% of the total yield, indicating that while mulch type significantly affects total production, it does not disproportionately impact the quality ratio of the harvested crop.

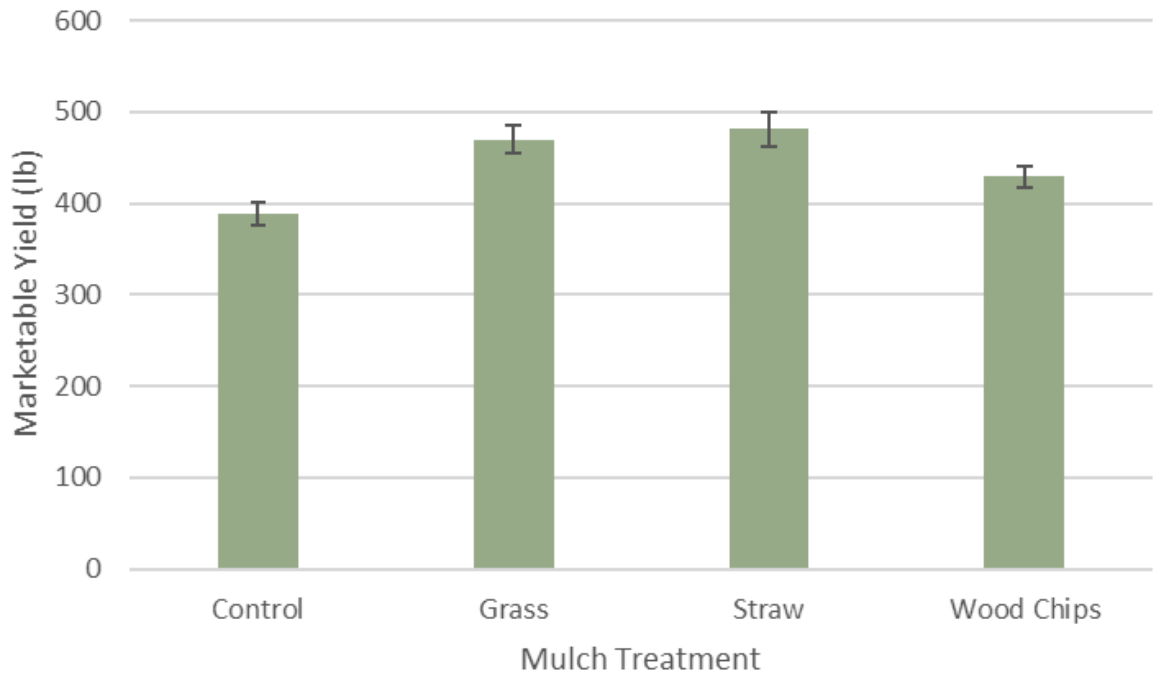


Figure 2. Total and marketable fruit yield of tomatoes grown with four different mulch treatments.*
**Error bars denote standard deviation*

TAKE HOME MESSAGES

Straw mulch showed the greatest increase in yield. Markisha noted that straw appeared to maintain more consistent soil moisture levels, which was crucial during a severe weather event involving heavy rain followed by a heatwave. The dense, light-colored straw also offered excellent temperature moderation and the most effective, long-term weed suppression, resulting in significantly reduced manual labor.

While grass mulch provided an initial cover and produced good yields, it decomposed quickly and had to be augmented over the growing season, resulting in higher labor requirements.

The wood chip mulch treatment experienced a slower start, likely due to initial nitrogen immobilization as the woody material began to break down. Its performance improved markedly later in the season, suggesting benefits that could be more pronounced in trials extending over multiple years.

Finally, the bare soil was the most vulnerable to environmental stresses like rapid temperature shifts, drought, and heat, as well as to disease pressure, specifically an early onset of blight, which ultimately contributed to the lowest final yield. The bare soil plot also had the greatest weed pressure, necessitating increased labor for weeding.

Markisha plans to continue the use of the straw as her preferred mulch and work to eliminate bare soil for long season crops as much as she is able. The straw was readily available from a nearby organic farm, easy to apply, suppressed weeds, and helped mitigate both drought and excess water stress in her tomato crop.

ACKNOWLEDGEMENTS

This report is made possible by OFRF's Farmer-Led Trials program. In this program, farmers receive technical support to address their challenges through structured on-farm trials. To learn more about OFRF Farmer-Led Trials Program, visit our website page at https://ofrf.org/research/farmer-led-research-trials/

To cite this paper, please use the following: Markisha Parker, M. Hathaway, H. Estrada, T. Velez. 2025. Farmer-Led Trials: Comparing Mulch Types on an Urban Farm in Transition. Final Report. Organic Farming Research Foundation. www.OFRF.org

ORGANIC FARMING RESEARCH FOUNDATION

United States Department of Agriculture
Agricultural Marketing Service
National Organic Program
Transition to Organic Partnership Program

USDA ORGANIC