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FARMER-LED TRIALS REPORT

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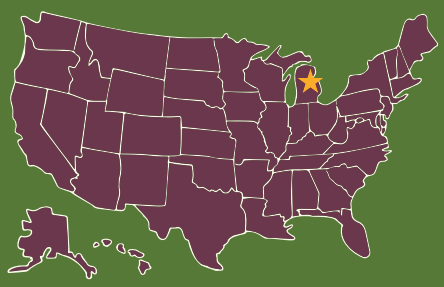
Farmer-Led Trials: Comparing a Living Clover Mulch to Landscape Fabric in Organic Strawberry Production



2025

Farmer-Researchers:
Mike Lucas and Rollin Baker,
Farmacea
Munith, MI

IN A NUTSHELL

Farmacea, a 31 acre farm in Munith, Michigan, transitioning to certified organic production, compared a living white Dutch clover mulch to conventional landscape fabric in strawberries to determine whether the living mulch would produce superior yield and quality.

In year one of the trial, landscape fabric treated plots produced dramatically higher berry yields than the clover living mulch plots, averaging 239 berries per plot compared to 34 for clover (a 7 times difference). Strawberry plants in the landscape fabric beds were also consistently taller, wider, and more floriferous throughout the season. Weed pressure, moisture retention, and slug damage all differed notably between the two systems, and soil under the clover beds showed visibly different structure, color, and nodule activity by season's end. The gap was clear enough, on paper and in the field, that Mike and Rollin do not plan to use clover as a strawberry mulch again.

It was a challenging year for strawberries across the region, with early heat and wind reducing yields for many Michigan growers. Farmacea's meticulous, trial-driven attention to watering and management helped their patch thrive when many larger nearby farms struggled.

ABOUT THE FARM

Strawberry plots with landscape fabric at Farmacea.

Farmacea sits on 31 acres in Munith, Michigan, land that had been dedicated to conventional corn production for decades.

Run by Mike Lucas and Rollin Baker, the farm has spent the past two years converting roughly 2 acres into arable, organically managed ground, incorporating leaf mold and other organic materials to rebuild soil quality.

Mike and Rollin see their participation in structured, farmer-led research as part of a broader effort to bring more attention and resources to organic practices, which they feel have long been overlooked in agricultural research relative to conventional methods.

Rollin Baker

"For too long, the bulk of attention, funding, and resources in the agricultural research world have gone toward 'conventional' farming methods. As a result, advances in organic farming have stalled and many consider it an inefficient and outdated way to produce food. We couldn't disagree more. We see participating in a research trial on organic farming to be an important step in turning this tide, and hope that it will lead to better understanding and acceptance of these essential practices."

Mike Lucas

- Rollin & Mike, Farmacea

WHAT WAS THE ON-FARM TRIAL ABOUT?

As they work toward certified organic status, Mike and Rollin are focused on growing healthy, sustainable fruits and vegetables for their community, guided by a philosophy of food as medicine.

The duo were interested in moving away from plastic mulch for several reasons: reducing reliance on nonrenewable, petroleum-based materials, preventing microplastic buildup in their soil, and cutting down on manual weeding labor over time. They were interested in two alternatives to plastic: 1. landscape fabric, and 2. utilizing a living mulch of white Dutch clover (Trifolium repens). They set out to compare the two systems, and find one that could suppress weeds, build soil structure, and reduce the farm's plastic footprint, provided it didn't come at too steep a cost to yield.

Beds prepped for the trial planting, with landscape fabric in place.

The guiding research question for this trial was: **Does a living clover mulch produce higher strawberry yields than landscape fabric?**

White Dutch clover growing between strawberry plants in the trial plots

HOW WAS THE TRIAL DONE?

For their trial, Mike and Rollin established six beds: three planted in the conventional landscape fabric (LF) system, and three using clover as a living mulch (CC). Each bed contained the same mix of three strawberry cultivars, Earliglow, Jewel, and Sparkle , so that variety composition was consistent across treatments.

The trial was arranged as a randomized complete block design with three replications. Within each replication, there was one bed (or plot) of berries planting into landscape fabric, and one planted to the living mulch of Dutch clover.

Getting the trial established in 2025 took some troubleshooting: clover planting was delayed by weather and farm facility damage, and deer intrusion required building higher fencing around the trial area before it could proceed reliably. This pushed the start of the trial to the following spring (2026).

In 2026, data collection began with early-season crown measurements (height, width, and flower counts) taken in mid-March through mid-May, sampling every fifth plant per plot. Partway into the trial, Mike and Rollin adjusted their protocol: clover plots were sending out many runners and establishing additional plants along the row, while plots with landscape fabric put their energy into a single, larger main crown. Comparing yield plant-by-plant would have understated the clover system's full productivity, so all yield data (berry count) was collected per plot, capturing runners along with the main crowns.

Flowering began around April 22, roughly a week earlier than the previous year. Berry harvest was initiated in early June, during which berries were picked twice weekly through the end of the season. Berry counts and observations were recorded on a whole plot basis. Mike and Rollin installed bird netting mid-season to protect the crop from predation.

Deer fencing installed in strawberry plots.

FINDINGS

Total berry counts per plot differed significantly by treatment (p=0.031). Berry count in the landscape fabric plots averaged 239 (median 217, SD 63.9, range 189 to 311), compared to just 34 berries (median 34, SD 3.0, range 31 to 37) in the clover living mulch rows, a roughly sevenfold difference (Figure 1).

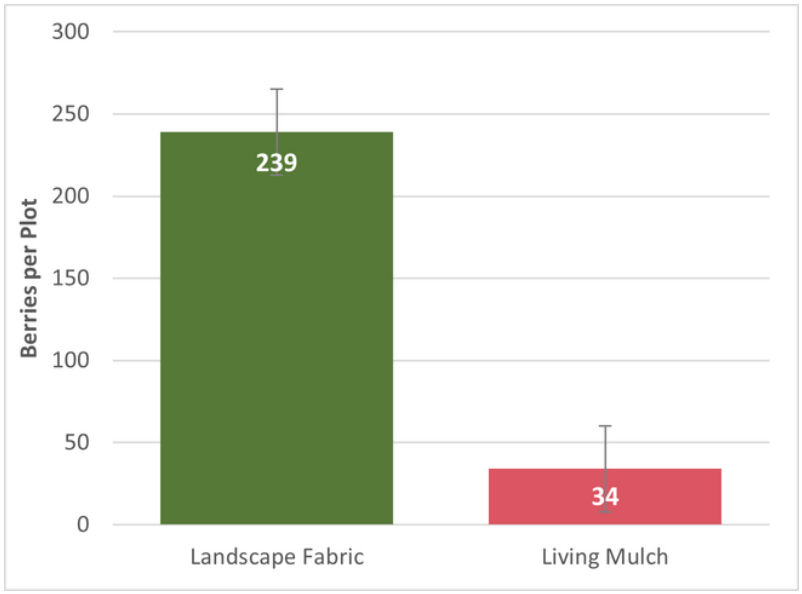


Figure 1. Total berry yield for strawberries grown under landscape fabric and living clover mulch*.
*Error bars indicate standard error.

Early-season crown measurements pointed toward this outcome well before harvest began. Plants flanked by landscape fabric developed a single, larger, well-defined crown, while living mulch plants put more energy into sending out numerous small runners, establishing additional plants rather than one dominant crown.

Mike and Rollin observed that flowering pattern differed among treatments as well. Plants with landscape fabric showed a more variable, "boom or bust" flowering pattern, with some plants producing many (e.g., 12) flowers and others almost none, while living mulch plants flowered more consistently but with fewer flowers (e.g., 3 to 4) per plant.

Further driving the yield gap, direct competition between the clover and strawberry crowns in the living mulch treatment appeared to limit plant vigor, and weed pressure from species like dandelion, curly dock, and horseweed was notably heavier there as well. As the clover canopy filled in, the moist, dense cover created favorable conditions for slugs, and slug damage and rotten berries were a recurring issue in the clover plots. Berries held up on landscape fabric above the soil surface showed much better resistance to slug damage and rot, and were markedly easier to harvest, an observation that aligns with other, larger scale studies.

While there was greater pest and weed pressure, the clover did establish well in the strawberries and showed evidence of nitrogen fixation by the presence of visible nodule formation and activity. Outcomes could be different in subsequent seasons, and may be worth future investigation.

TAKE HOME MESSAGES

Landscape fabric was the clear winner for Farmacea, both in the data and in the day-to-day experience of managing the trial. The clover living mulch competed directly with the strawberry crowns, drove up weeding and pest management labor, and led to a significant, statistically-confirmed yield reduction. Based on this outcome, Mike and Rollin do not plan to plant strawberries into clover mulch again.

That said, the potential nitrogen fixation and other benefits observed under the clover plots are a reminder that the clover wasn't a failure on every front, just a poor fit for strawberries specifically in this system. Rather than abandon the space, Farmacea is considering replanting that area with a taller crop, such as rhubarb, that could take better advantage of what the clover living mulch offers without competing so directly at ground level.

The trial's built-in rigor also had a side benefit: the discipline of careful, consistent watering and monitoring required by the trial helped Farmacea's strawberry patch thrive during a difficult regional season, even as early heat and wind hurt yields for many other Michigan growers.

- Landscape fabric produced dramatically higher yields (239 vs. 34 berries/plot average, and was also easier to manage: upright plants, low pest pressure, and minimal rot.
- Clover living mulch drove up weeding and harvest labor, invited slug pressure, and led to more rotten berries; Farmacea will not use it as a strawberry mulch again.
- The clover established well, but did compete with the strawberries in the low growing canopy. A different cash crop with a more upright growth habit may be a better match for that mulch system going forward.
- The trial's structured data collection and care requirements may have contributed to Farmacea's crop surviving a tough regional season better than other farms in the same climatic region.

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/

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Farmacea Strawberry Trial Explores Sustainable Mulching

Written by Mary Hathaway, OFRF's Research & Education Program Manager

In the heart of Munith, Michigan, Farmacea is undertaking an exciting experiment to help enhance their farm systems and design. Run by Mike Lucas and Rollin Baker, the farm's 31 acres had previously been dedicated to conventional corn production for many decades. Over the past two years, Mike and Rollin have been diligently working to convert about 2 acres into arable, quality land by incorporating leaf mold and other organic materials. As they work to transition their land to certified organic, they are excited and energized to grow healthy, sustainable fruits and vegetables for their community. Mike and Rollin are committed to bringing the land back to life and hope to honor the tradition of Food as First Medicine.

The Strawberry Trial: Plastic vs. Clover

Farmacea's project is a strawberry trial comparing traditional plastic mulch to a living mulch of white Dutch clover. Their research question is simple but will help Farmacea determine which strawberry planting system will work best for them in the coming years: **"Does a living clover mulch produce higher strawberry yields than a plastic mulch?".**

To answer this, they've set up six beds. Three beds use the conventional plastic mulch, while the other three are planted with New Zealand White Clover (*Trifolium repens*) to serve as a living mulch. Both sets of beds include a mix of strawberry cultivars: Earliglow, Chandler, Allstar, and San Andreas, ensuring consistency in strawberry varieties across the trial.

Careful initial planning was essential, focusing on a consistent number and mix of strawberry plants in each bed. Mike and Rollin standardized the beds and timed clover planting, which faced weather-related delays and farm facility damage. Additionally, deer intrusions necessitated the construction of higher fences to protect the crops.

What They're Measuring

Farmacea will be tracking several key metrics to determine the success of each mulching method:

- **Yield:** Weight of harvested berries, percent marketable yield, and pint counts.
- **Brix:** A measure of sugar content in the berries.
- **Weed Pressure:** Observations and frequency of weeding interventions.
- **Photo Documentation:** Keeping a visual record of the trial's progress.
- **Soil Testing:** Collecting samples to analyze soil health.

Data is being collected consistently over the season, with harvests twice weekly. They plan to document everything from the number of pints of berries to the weight of both marketable and unmarketable yields. Brix levels are being measured to gauge the sweetness of the berries and will ideally be taken at three intervals during the strawberry season.

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– Rollin & Mike, Farmacea

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Learn more about OFRF's Farmer-Led Trials Program

Contact Us

www.OFRF.org

office@ofrf.org

831-426-6606