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*Photo credit: Passion Garden*

# FARMER-LED TRIALS REPORT

## PASSION GARDEN

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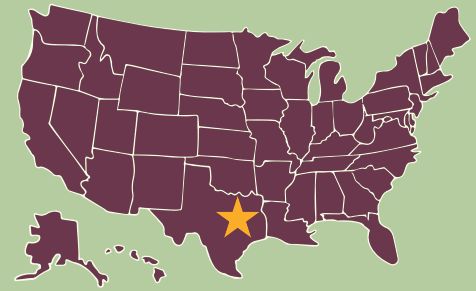
## Farmer-Led Trials: Mesquite Bean Meal as Soil Amendment

### IN A NUTSHELL

Passion Garden, a three-acre farm in Waco, TX, conducted a Farmer-Led Trial to evaluate the effectiveness of utilizing locally harvested mesquite bean meal (MBM) as a soil amendment. Farmer Kay Bell assessed the impact of MBM on 'Celebrity' tomato yields. Findings indicated that the MBM treatment significantly increased both the total and marketable yield of tomatoes compared to the control, suggesting mesquite bean meal may be a promising and valuable on-farm fertility resource.

### ABOUT THE FARM

Kay Bell is the farmer/owner of Passion Garden, a three-acre farm in Waco, TX. With ten years of farming experience, Kay is now in the process of transitioning Passion Garden to certified organic status, with a strong focus on developing on-farm fertility. She grows a diverse assortment of fruits, vegetables, and herbs, which she sells as fresh produce and herbal teas at local farmers' markets and health food stores.



2025

Farmer-Researcher:

Kay Bell,

Passion Garden

Waco, TX



*Kay Bell, Passion Garden*

Kay prioritizes the use of sustainable and locally available, on-farm resources to improve her soil health. A long-standing consideration in her fertility plan has been the utilization of mesquite tree bean pods. Driven by her commitment to community well-being, she researched the mesquite bean's nutritional composition, finding it to be high in protein and rich in various other nutrients. Given the tree's prevalence on her property and the relative ease of harvesting the pods, Kay believed this resource can be a valuable amendment for enhancing her soil health.



Mesquite beans collected from Kay's property.

### How Kay made her Mesquite Bean Meal (MBM):

- Harvest mesquite beans from the trees on her property.
- Blend the mesquite beans in the pod until well ground.
- Sift the powder to remove any hard shell fragments.
- Store in an airtight container until ready to apply.

## WHAT WAS THE ON-FARM TRIAL ABOUT?

To test her idea, Kay wanted to build an experiment that would assess the impact of mesquite bean meal as a soil amendment on the yield of 'Celebrity' tomatoes, one of her favorite tomato varieties. She hoped that the addition of MBM would result in a measurable increase in total or marketable tomato yield compared to the yield in her normal soil amendments used in her raised beds. To create the MBM, Kay harvested the pods, and used a simple mill to grind them so that they were in an easy to use powder format.

## HOW WAS THE TRIAL DONE?

In the beginning of August 2025, with technical support from OFRF's Farmer-Led

Trials Program staff, Kay prepared eight raised beds in a randomized complete block design with four replications (Figure 1). Each bed measured 4 feet wide by 8 feet long, in keeping with Kay's space limitations. Beds were filled with the same base soil mixture and compost before planting. At the time of transplanting, the four treatment raised beds received ½ cup of the MBM. During the growing season, all of the beds were treated consistently, with the same irrigation schedule, staking, and pest management.



Raised beds at Passion Garden.

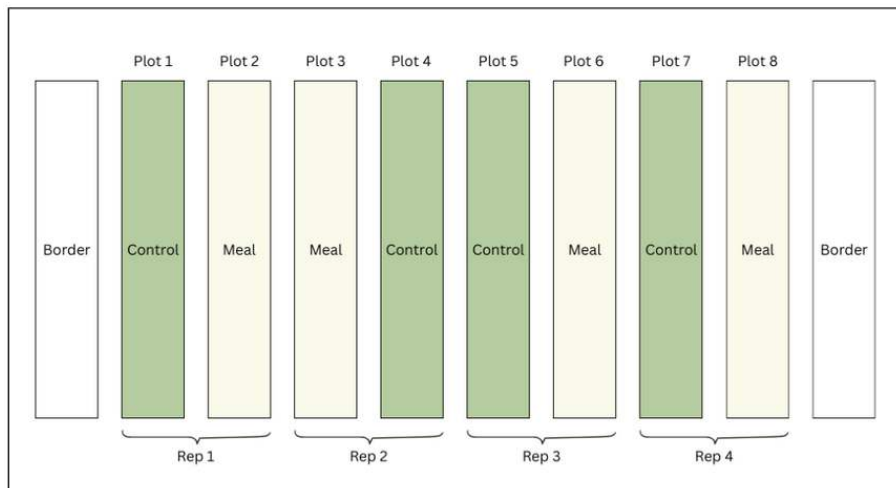


Figure 1. Plot map showing the trial layout at Passion Garden.



By mid-October, Kay began tracking the yields, her key metric of the trial. This was recorded as total weight and marketable weight, the weight of tomatoes that meet standards for commercial sale (free from major blemishes, cracks, or rot). Kay also took observations of plant health, pest pressure, and any plant losses that might impact the findings for the trial.

Anecdotally, Kay observed improved water drainage and thinks that the MBM helped improve the drainage in her clay soils. She also noted increased presence of worms and other soil organisms, and she speculates that the natural sugars in the MBM help attract more soil invertebrates.

## FINDINGS

Sample size in the trial was small, however, the analysis revealed a significant difference in yield between the control and meal treatment, with the treatment receiving the MBM having a positive impact on yield in both the total yield and marketable yield (Figure 2).

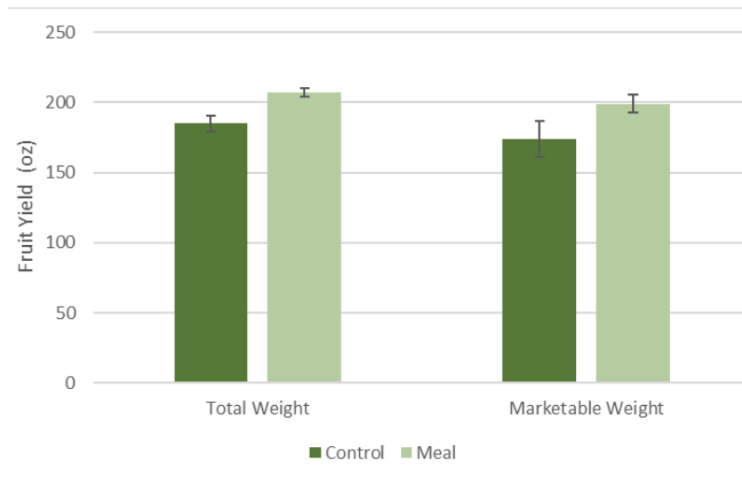


Figure 2. Total and marketable fruit yield of tomatoes grown with and without mesquite bean meal\*. \*Error bars denote standard deviation



AUGUST



SEPTEMBER



NOVEMBER-DECEMBER



JANUARY



Mesquite bean meal, used as soil amendment.

*“This trial has been an eye-opening experience that has motivated me to want to go into higher adventures in soil and crop science. I know this trial has made me stronger as a farmer. And I just look forward to experimenting with nature to grow things with resources I have on farm.*

*- Kay Bell*

## TAKE HOME MESSAGES

Kay will continue to use mesquite bean meal in her soil fertility plan, and hopes to see sustained improvements in her soil. She is excited to continue experimenting with MBM in the fields on different crops, and to learn more about the organisms that support a healthy soil microbiome.

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





## Farmer-Led Trials Program Spotlight: Passion Garden

### Experimenting with on-farm materials to create organic soil amendments

Written by Mary Hathaway, OFRF's Research & Education Program Manager, and Kay Bell, FLT Program participant.

Kay Bell has been farming for ten years on her three-acre farm in Waco, TX, called Passion Garden. She grows a variety of fruits, vegetables and herbs that she sells as fresh produce and herbal teas at local farmers markets and health food stores. Her farm is currently in the process of transitioning to certified organic, with a focus on building her own on-farm fertility.

Kay has a big focus on using locally available, on farm inputs to help improve her soil health, and has long considered using the pods of the Mesquite Tree Bean in her fertility plan. As a farmer focused on growing the health of her community, she looked into the nutrient content of Mesquite Bean, and realized that it has a high protein content and is rich in many nutrients. Since the tree is prevalent on her property, and the pods are not too difficult to harvest, she believed it could be a useful amendment in building her soil health.



Mesquite bean pods, collected by Kay Bell, to use as a soil amendment at Passion Garden

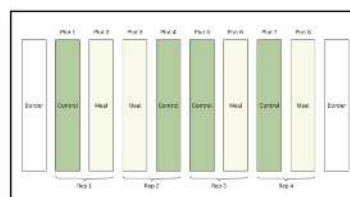
### Using Mesquite Beans as a Soil Amendment for Tomatoes

To test her idea, Kay wanted to build an experiment that would assess the impact of mesquite bean meal as a soil amendment on the yield of 'Celebrity' tomatoes, one of her favorite tomato varieties. She hopes that the addition of Mesquite Bean Meal (MBM) will result in a measurable increase in total or marketable tomato yield compared to her normal soil amendments in raised beds. To create the MBM, Kay harvested the pods, and used a simple mill to grind them so that they were in an easy to use powder format.

### On-Farm Trial Plan

In the beginning of August 2025, with technical support from OFRF's Farmer-Led Trials Program staff, Kay prepared eight raised beds, each measuring 4 feet wide by 8 feet long, to provide a uniform growing area for the plants. All of the beds were filled with the same base soil mixture and compost. Kay planted 4 tomato plants in each of the beds in September. At the time of transplanting, the four treatment raised beds received 1/2 cup of the MBM. During the growing season, all of the beds were treated consistently, with the same irrigation schedule, staking, and pest management.

By mid-October, Kay began tracking the yields, her key metric of the trial. This was recorded as total weight and marketable weight, the weight of tomatoes that meet standards for commercial sale (free from major blemishes, cracks, or rot). Kay also took observations of plant health, pest pressure, and any plant losses that might impact the findings for the trial.

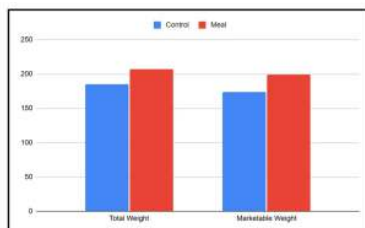


Plot map from Passion Garden's FLT Program trial

### Farmer-Led Trial Results: Tomato Production Increased with On-Farm Amendment

Once all of Kay's data had been collected, the analysis revealed a significant difference in yield between the control and meal treatments, with the treatment receiving the MBM yielding more per plant and overall than the control treatment.

Anecdotally, Kay observed improved water drainage and thinks that the MBM helped improve the drainage in her clay soils. She also noted increased presence of worms and other soil organisms, and she speculates that the natural sugars in the MBM help attract more soil invertebrates.



Yield results from Passion Garden's FLT Program trial, showing yield of tomatoes in the control group (blue) vs the group grown using Mesquite Bean Meal (red).



Prepped beds at Passion Garden during the 2025 FLT.

*"I know this trial has made me stronger as a farmer. And I just look forward to experimenting with nature to grow things with resources I have on-farm."*  
- Kay Bell, FLT Program Participant



Tomatoes harvest from Passion Garden, during the 2025 trial.



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