UNIVERSITY OF MISSOURI EXTENSION

Hydroponic Education in Southeast Missouri

Aufdenberg*, D.I.[1], Cabrera-Garcia, J.[2]

[1]Horticulture Specialist, University of Missouri Extension, Jackson, MO 63755, aufdenbergd@missouri.edu; [2]Horticulture State Specialist, University of Missouri Extension, 214B Waters Hall, Columbia, MO 65211, jcabrera-Garcia@missouri.edu;

INTRODUCTION

Hydroponic growing methods can be a sustainable alternative for growing specialty horticultural crops compared to traditional methods. Positive attributes include:

- Year-round production
- Can use less resources
- Higher yields per area
- Lower environmental risks
- Well suited for urban as well as rural areas
- Can be more profitable per square foot

From 2021 to 2022, there were 23 events and workshops that took place on various topics related to hydroponic production. The purpose of these activities was to educate students, hobbyists, secondary education agriculture teachers, and growers about sustainable hydroponic farming.

MATERIALS AND METHODS

Face-to-face and virtual hybrid events were planned and coordinated in Southeast Missouri.

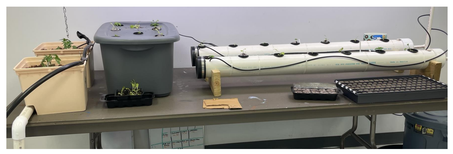
- 3 Individual lectures and workshops
- 4 FFA and 4-H workshops and demonstrations
- 13 hands-on presentations in three schools
- 1 Teacher workshops
- 2 Master Gardener workshops

Topics for Educational Events (varied by event):

- Introduction to hydroponic crop production
- Nutrient flow technique (NFT), deep water, Dutch bucket and aeroponics systems
- Managing hydroponic crops: lettuce, tomatoes
- Managing the hydroponic environment
- Nutrient solution EC and pH management
- Crop scheduling and seed starting
- Pest management and common problems
- Careers in horticulture and hydroponics

Equipment:

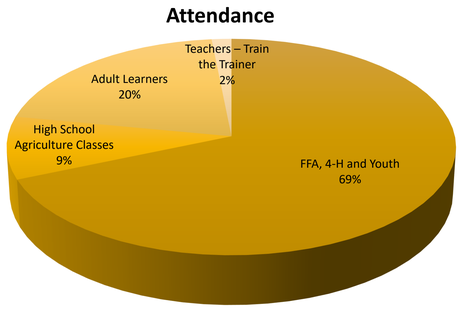
- Hydroponic Units: NFT, Dutch bucket, deep water culture and aeroponics
- pH and EC combination testing meter
- Solutions to adjust pH of nutrient solutions
- Growing supplies: seeds, rock wool, oasis and peat pellets

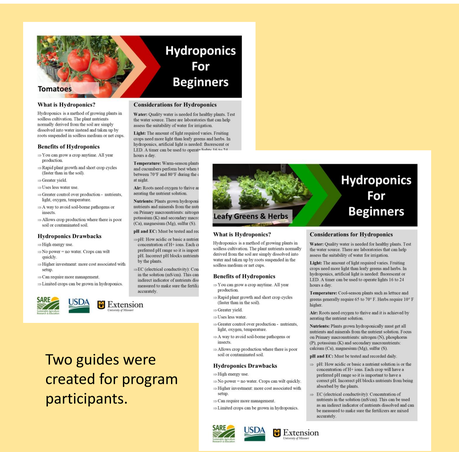


Dutch Buckets (left), Deep water culture (middle) and NFT units (right).

PROGRAM OUTCOMES

- In high school agriculture classes, students gained experience operating hydroponic units: NFT growing greens and herbs; Dutch buckets growing tomatoes and cucumbers; deep water culture growing greens and herbs; aeroponics growing greens and herbs
- High school juniors and seniors gained knowledge of careers in horticulture and hydroponics
- Adult learners gained knowledge through lecture, demonstration and hands-on learning
- Youth at various events gained knowledge of hydroponics through demonstration and hands-on learning
- Deliverables for dissemination: printed guide sheets; schematic drawings; recorded videos
- Hydroponic grower interview produced for high school career development
- Total attendance at workshops and events: 577





Two guides were created for program participants.

Various events: (a) Teacher Workshop; (b) Multi-school break-out session; (c) Hands-on learning with students; (d) Assembling aeroponics with 4-H youth; (e) Master Gardener workshop;

PROGRAM IMPACTS

Adult Impacts

- 100% of participants indicated an increase in knowledge
- 3 teachers continued hydroponic education to students after multi-session program had ended and had plans to continue in following school year
- 4 teachers purchased horticulture equipment for their classroom before the teacher workshop was over
- 37 home gardeners are currently trying hydroponics at home
- 3 commercial growers are experimenting with hydroponics to expand their operation
- 74% plan to attend additional future hydroponic workshops

Youth Impacts

- 100% of participants indicated an increase in knowledge
- 66% of students can explain how hydroponics can be sustainable
- 4 senior students from multi-session hydroponic program are pursuing secondary horticulture education and considering hydroponics as a career option
- 6 Students at the high school took an exceptional interest (per teachers) and indicated interest in greenhouse production with hydroponics
- 24 students tried hydroponics at home after the workshops

Future Implications

- Students need basic understanding of plant anatomy and germination before learning hydroponics
- pH and EC is hard to understand for youth and adults. More time is needed to cover the materials adequately and for demonstration
- Students need more guided hands-on time with instructors (twenty minutes allowed by schools is inadequate)
- Ready-made hydroponic units can be costly, therefore many adults are wanting “Build-your-own” hydroponic systems
- A good suitable growing area can be hard to find in schools and homes

Part of this project was funded by SARE. Check out the final report for “Sustainable hydroponic farming as a viable career path for the youth in Butler County Missouri’

Acknowledgements: SARE Sustainable Agriculture Research & Education; USDA; Extension University of Missouri

MU Extension University of Missouri