

## Need/Goal Statement

Oyster mushrooms, *Pleurotus* spp., and Bella mushrooms, *Agaricus* spp., are crops that offer profit potential for local Missouri growers through direct-market sales (farmers markets, on-farm sales, CSA). It is difficult, however, for growers to commit time to substrate production and inoculation. A satellite farming system allows production capability for growers with ready-to-grow production kits produced by Willow Mountain Mushrooms. This demonstration project compares two production facilities in a satellite farming system – Mushroom Cabinets placed in an available on-farm room with a prefabricated Mushroom Pod. Data were collected, products were marketed and sold, and the facilities were assessed in 2021. Educational events including a Mushroom Production Workshop, cooking and freeze-drying demonstrations, student and public tours were conducted exposing at least 250 people to the project.

## Introduction

- Mushrooms are a crop that offers profit potential for local Missouri growers through direct-market sales (farmers markets, on-farm sales, CSA). It is difficult, however, for growers to commit time to substrate production and inoculation.
- In 2019, the Missouri State University College of Agriculture funded a pilot project to develop a satellite mushroom production room at Mountain Grove. It was challenging to maintain proper temperature, humidity and proper air flow in the room.
- In order to better control the production environment, Bob Semyck of Willow Mountain Mushrooms developed Mushroom Cabinets to use in in the room at Mountain Grove and a prefabricated, stand-alone Mushroom Pod delivered on-site. This project demonstrates and compares satellite mushroom production in the Mushroom Cabinets and the Mushroom Pod.



Photo above – Oyster mushroom bags producing in the Mushroom Cabinet.

Photo right – Bob Semyck shows workshop attendees features of the Mushroom Pod.



## Materials and Methods

- The Mushroom Cabinets operated from April 1 through October 3, 2021. The Mushroom Pod operated from August 4 through December 17, 2021.
- Production kits were usually replaced monthly.
- Average temperature was maintained at 65 degrees Fahrenheit and average relative humidity was maintained at 85% with ultrasound disc foggers. Oyster shelves received 16 hours artificial light per day.
- The Mushroom Cabinets and the Mushroom Pod were checked daily and harvested as needed. Environmental data was collected in the Cabinets and in the Pod from August through December. Mushrooms were packaged and sold retail at the Mountain Grove Sales Room for \$3.50 per package of Bellas (6 oz) and \$3.50 per package of Oysters (5 oz). Other marketing avenues were used to sell product both packaged and bulk. Spent Bella mushroom compost was sold for \$5.00 a box as a by-product.
- Fungus gnat infestation was the most challenging problem and several control methods were used including fly strips, nematode on casings and other casing treatments and pyrethrum foggers.

Table 1. Comparison of Bella mushroom production with one shelf (3 boxes) in the mushroom cabinet with one shelf (3 boxes) in the mushroom pod.

Mushroom Cabinet Shelf 4		Mushroom Pod Shelf 2	
Harvest Dates	Production <sup>1</sup>	Harvest Dates	Production
4/15 – 5/9	5.81 lbs/box	8/14 – 9/6	5.78 lbs/box
5/18 – 6/18	8.91 lbs/box	9/10 – 10/15	7.95 lbs/box
6/18 – 7/10	3.58 lbs/box	10/17 – 11/12	6.09 lbs/box
7/19 – 9/18	5.30 lbs/box	11/12 – 12/13	6.64 lbs/box
Average lbs/box	5.90 lbs	Average lbs/box	6.62 lbs

<sup>1</sup>Data are presently being evaluated and additional information will be available at a later date.



Detail of air-flow management system in the Mushroom Cabinet for Bella production.

## Results and Discussion

- Oyster bags (kits) yield approximately 3 lbs. per bag in the first month and continue until exhausted. Bella boxes (kits) are harvested 3 times over a month and yield approximately 7 lbs. per box (Personal communication, Bob Semyck, Willow Mountain Mushrooms). See Table 1 for a comparison of Bella yield in the Mushroom Cabinet and Mushroom Pod.
- Oyster and Bella production and environmental management was improved both in the Mushroom Cabinets and in the Mushroom Pod in 2021 compared to the pilot production project in 2019. The Mushroom Pod used an air conditioner/heat unit which make temperature regulation possible into the winter, but humidity was maintained at favorable levels in both the Cabinets and the Pod during production.
- A workshop was held on August 19, 2021, with attendance limited to 24 due to Covid restrictions. Participant evaluation results indicated a strong interest in the production system and an interest in the educational materials presently under development. The project was discussed with at least 250 additional people in the course of tours, mushroom cooking demonstrations, and student activities
- The Mushroom Pod was delivered later than the cabinets due to supply chain issues. Data are presently being evaluated and more information is forthcoming..



Bella mushrooms in boxes (above) and Oyster mushrooms in bags (below).

## Goals and Objectives

- To demonstrate and compare satellite mushroom production in Mushroom Cabinets and the Mushroom Pod.
- To promote both grower and consumer awareness of locally produced mushrooms.
- To create a curriculum for growers to use to learn to produce mushrooms profitably in the satellite farming system.
- To educate outreach and extension personnel on satellite mushroom production.

### References

- Willow Mountain Mushrooms <https://willowmountainmushrooms.com/>
- Small-scale Production of Oyster Mushrooms by D. K. Lee and Jeremy Shafer, presented at the 2018 Greenhouse and High Tunnel Workshop, Mountain Grove, MO
- [https://ag.missouristate.edu/assets/MtnGrv/mushroom\\_DKLeeShafer.pdf](https://ag.missouristate.edu/assets/MtnGrv/mushroom_DKLeeShafer.pdf)
- Mushrooms growing well in shroom room July 10, 2019
- <https://blogs.missouristate.edu/fruitexperimentstation/2019/07/10/mushrooms-growing-well-in-shroom-room/>
- Mushroom Project Central <https://ag.missouristate.edu/MtnGrv/mushroom-project-central.htm>

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