Improving Farm Sustainability with High Tunnels

Lewis W. Jett, Ph.D.
State Vegetable Crops Specialist
Department of Horticulture, University of Missouri
(573) 884-3287 Office  JETTL@MISSOURI.EDU
Energy Use in the United States-2005

- OIL: 40%
- Natural Gas: 23%
- Coal: 22%
- Renewable: 7%
- Nuclear: 8%
- Solar: 0.07%

Source: U.S. Dept. of Energy
Energy Use by U.S. Agriculture:

- Diesel: 27.3%
- Electricity: 29%
- Gasoline: 20.7%
- Natural Gas: 8.5%
- LP Gas: 6.3%
- Pesticides: 4.5%
- Fertilizers: 3.6%
United States Food System Energy Use
Total = 10.25 Quadrillion Btu

- Home Refrigeration/Preparation: 31%
- Restaurants/Caterers: 7%
- Food Retail: 4%
- Packaging: 7%
- Processing: 16%
- Transport: 14%
- Agricultural Production: 21%

Source: Heller and Keoleian
To transport a truck load of produce from Yuma, AZ to St. Louis, MO, 290-300 gallons of diesel fuel or 2.7 million BTU/truck are consumed.
US Per Capita Fresh Fruit and Vegetable Consumption:

Sources: USDA/ERS
October 1999, and July 1999
Welcome to Columbia Farmers Market
locally grown goods
SAT 8-12 NOON
MON-WED 4-6 PM
MID-MARCH - MID-NOV.
Direct Marketing of Vegetables:

Supermarkets

Restaurants
TOMATOES Mississippi County
Home Grown Tomatoes

$1.00 lb.
Missouri Climate:

Most of the state is in Hardiness Zone 5
Market Garden
Greenhouse Tomatoes
The estimated capital requirement for a 24x96’ greenhouse is approximately $5-10/ft^2

Source: MSU Greenhouse Production Guide
High Tunnel Designs:
What is a High Tunnel?

1. Uses solar heat. (back-up heaters optional)
2. No electricity (fans, heaters, vents, etc.)
3. Vented through sidewalls or end walls.
4. Drip irrigated.
5. Ground culture.
6. Single layer of plastic (6-mil.)
High tunnels increase the average daily temperature.
High tunnels are manually vented through roll-up sides or end walls.
Early-Season Tomatoes:
Synchronizing Production with Price:

![Graph showing price per pound for different date ranges.]

- Blue line represents US No. 1 (large).
- Red line represents US No. 1 (med).
- Green line represents LB/Plant.

What is being produced within high tunnels?

Number (growers)

- Tomatoes
- Salad Crops
- Cucubits
- Peppers
- Small Fruits
- Cut Flowers
- Herbs
PLANTED: March 20
HARVEST: June 15-July 2
Intercropping vegetables within a high tunnel:
No significant yield reduction of **tomatoes** when intercropped with **lettuce** within a high tunnel.
University of Missouri Extension Publication No. M170.

High Tunnel Tomato Production
High Tunnels in Production 2004:

Over 100 high tunnels have been constructed by growers since 2002 in four Midwest states.

Source: High Tunnel Survey, 2004 (n=98)
High Tunnel Cucurbit Production:
Galia melon

‘Athena’ cantaloupe
Average melon yields: 16-20 lbs/plant
Pollination is critical for cucurbit crops.
Hoop House Zucchini Squash
Cucumbers
Spring

Leafy greens

Summer

Melons

Tomatoes

Fall

Broccoli
Peppers: 8-10lbs/plant
Grow Specialty Vegetables

Beets

Baby squash

Fingerling potatoes
4-6 lbs of potatoes/linear foot.
‘Candy’ Onion
Strawberries:
Average 1 lb. of marketable fruit per plant
Haygrove® High Tunnels
High Tunnels Improve Farm Sustainability:

- Increase net farm income.
- Reduced labor intensity.
- Lower fixed costs.
- Higher marketable yields.
- Diverse market outlets.
- Increase supply of fresh vegetables.
- Reduce pesticide use.
Welcome

High tunnels, or hoophouses, are unheated greenhouses that can help market gardeners extend their growing season so that they can improve the profitability of their farms.

This website is part of a USDA-sponsored project that is testing and promoting high tunnel systems in the Central Great Plains.

We hope to provide information developed under our project, and links to relevant sites around the world, so that growers and educators have a one-stop source where they can find information on all aspects of high tunnel construction and use.

Cut Flowers and Strawberries growing in a High Tunnel at Henry’s Plant Farm in Lecompton, Kansas.

We welcome your input and feedback to make this site useful. Please let us know of links to sources of information on high tunnels that we should include, or if you other suggestions or contributions you’d like to make.