High Tunnels: Are They for You?

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High Tunnels: Are They for You?

Background Information

- high tunnel structures
- high tunnel versus other techniques, systems
- specific opportunities, requirements
STRUCTURES
high tunnel
Major HT Characteristics

- metal, wood, and/or PVC frame
- clear plastic cover (1-2 layers)
- soil floor (not required)
- peak height at least 8 ft
Plasticulture in China

image courtesy Will McGuire
High Tunnel Costs

• depend strongly on size, design, features

will continue to change
High Tunnel "Chassis"

image courtesy http://www.aesop.rutgers.edu/~horteng/hightunnels.htm
chassis = frame, plastic, irrigation
High Tunnel Costs

- chassis
  + repair/replace
  + climate control
  + labor
High Tunnel Costs

+ climate control
  • ventilation
  • raised beds, row covers
  • sensors
  • heating (temporary, permanent)
Major HT Materials Costs

- frame (material, durability, portability, number braces)
- film (number layers, type)
- end-, side-wall design
- climate control
High Tunnel Costs

• depend strongly on size, design, features

... in OH, new materials cost $2.38-7.24 (avg. $3.95/ft²)
High Tunnel Costs

- cannot be insured
- usually not taxed
  (depends on local ordinances)
"Do not remove a fly from your friend's head with a hammer."

- Chinese Proverb
HIGH TUNNEL VERSUS OTHER TECHNIQUES, SYSTEMS
images courtesy Ken-Bar, MN Artists, The C
Season Extension Techniques

- transplanting
- raised beds
- mulches, row covers
- protected culture
What makes high tunnels work? Light carries heat. Enters, but does not leave HT. When dark, plastic limits heat loss to sky.
source: NOAA

AZ (YUMA)

ME (CAR, POR)

OH (CVE, COL, DAY, TOL)

number days per month clear sky

0

5

10

15

20

25

SEP OCT NOV DEC JAN FEB MAR APR

source: NOAA
Soil temperature (F) at 2 in.

10/9 10/23 11/6 11/20 12/4 12/18 1/1

Wooster, OH 2003-2004

Field
High tunnel
Natural Law

Q10

\[
\frac{\text{rate at } X + 10 \text{ temp}}{\text{rate at } X \text{ temp}} = 2
\]
SPECIFIC OPPORTUNITIES, REQUIREMENTS
OPPORTUNITIES
High Tunnel Use:
... can extend the season
(help farmers "sell high")
Plant, Harvest Dates

Field: Plant (Jan, Mar, Jun) | Harvest (Apr, May, Jul, Aug, Sep, Oct, Nov, Dec)

Approximate pounds of tomatoes per week and approximate $/lb at Homerville 2006 & 2007

Pounds were estimated from box counts and supposed weight of the various boxes and containers used for tomatoes at Homerville.
Fresh Market Tomato (vine-ripened)

Month 1 2 3 4 5 6 7 8 9 10 11 12

Dollars per single layer flat
8
10
12
14
16
18

Source: USDA-AMS, Pittsburgh Terminal Market Prices

2007
Fresh Green Beans

Source: USDA-AMS, Pittsburgh Terminal Market Prices

dollars per bushel

2007
High Tunnel Use:

... can minimize supply gaps (crop stress)
DISEASES
INSECTS
WEEDS
High Tunnels:
• protect crop
• save days
Most Current HT Users ...

... also farm open fields

... grow vegetables

(use for other crops increasing)
OH population density
254 people/mi²

Photo courtesy K. Date, The Countryside Program
High Tunnel Users

Approach has implications for high tunnel users.
High Tunnel Users

- Farm size, income
- HT experience

Also vary in market approach (direct, wholesale, etc.) and location.
High Tunnels: Are They for You?
BASIC REQUIREMENTS
Success with High Tunnels Requires ...

• system thinking, action
Success with High Tunnels Requires …

• system thinking, action
• money (build, maintain)
• fewer days off
• "babysitting": ventilate, irrigate
• specific equipment
• specific varieties, ICM practices
OTHER
COMMENTS
Most high tunnel crops are grown in soil. Still, hydroponic and container production are options.
non-circulating, hydroponic, float-bed system
bag culture
Many crops can be grown in a high tunnel. Some tend to be better suited for the system and more profitable.
HT Production Profitable? Usually.
Use of Grafted Plants may Enhance High Tunnel Production.
scion

rootstock
combine and secure
direct combination of traits
Grafting can:
- overcome breeding barriers
- ... time, money, technology

**Goal:** improve vigor, stress resistance, yield, quality
Grafting Application

- greenhouse vegetables
- field-based vegetable production in Asia, areas of Europe
For Wider Application ...

- post-grafting environment ("take", shipment)
- economics (price, seedling-plant management)
For Wider Application ...

- rootstock-scion compatibility
- trait retention, enhancement under varying environments
"Grafting to improve organic vegetable production in field and high tunnels systems"
SUMMARY
High Tunnels 101

Goal

• balanced, introductory view of the pros and cons of high tunnel production of vegetable, fruit, flower and herb crops
High Tunnels 101

Content – 25 FAQs

1. Factors to consider before buying a high tunnel
2. Preparing to build and building a high tunnel
3. Preparing to grow in a high tunnel
THANK-YOU and GOOD LUCK!

QUESTIONS?
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