Melon & Strawberry Production Within High Tunnels in the Central Midwest

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Benefits of a High Tunnel:

• Low-cost ($).

• Very productive.

• Exclude pests (great for organics).

• Extend the growing season (3 months).

• Diverse production of many vegetables.

• Supplement field production.
What crops are being grown in high tunnels in the Midwest?

Source: 2004-05 Central Great Plains High Tunnel Survey
Tomatoes are an excellent early and late season crop for high tunnels.
Good cash crop rotation choices for tomatoes?
Vine-ripened melons
Muskmelons:

- Good rotation choice (botanically unrelated to tomato).
- Amenable to trellising (vertical growth).
- Premium price for early-season crop.
- Thrive in the dry microclimate of a high tunnel.
‘Lavigal’

Galia-type Melons:

Green to white flesh

Small seed cavity (good for shipping)

Very sweet!
Aromatic melons
'Galia 152'

Muskmelon

'Athena'

Muskmelon
Charentais Melons:
(‘Savor’ or ‘French Orange’)
(true cantaloupes)
‘Prescott Melon’ (Cantaloupe)
Large seed cavity and thick rind
Palm-sized cantaloupes (muskmelons)
Foliar diseases
Sunburned fruit
Fruit cracking
Research high tunnels located at Columbia, MO (38° N lat.)
Potential Varieties
<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Cucurbit type</th>
<th>Days to maturity</th>
<th>Fruit description</th>
<th>Disease tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athena</td>
<td>Muskmelon</td>
<td>80</td>
<td>Oval/round fruit with minor netting and no sutures.</td>
<td>PM$<em>{1,2}$ F$</em>{0,1,2}$</td>
</tr>
<tr>
<td>Aphrodite</td>
<td>Muskmelon</td>
<td>75</td>
<td>Oval, large fruit. Light sutures.</td>
<td>PM$<em>{1,2}$ F$</em>{0,1,2}$</td>
</tr>
<tr>
<td>Ambrosia</td>
<td>Muskmelon</td>
<td>86</td>
<td>Round fruit. Coarse netting. Good garden cultivar.</td>
<td>PM</td>
</tr>
<tr>
<td>Crescent Moon</td>
<td>Muskmelon</td>
<td>73</td>
<td>Large, eastern-type melon.</td>
<td>PM$_{1,2}$</td>
</tr>
<tr>
<td>Odyssey</td>
<td>Muskmelon</td>
<td>80</td>
<td>Round, large fruit with coarse netting and shallow sutures</td>
<td>PM$<em>{1,2}$ F$</em>{0,1,2}$</td>
</tr>
<tr>
<td>Primo</td>
<td>Muskmelon</td>
<td>78</td>
<td>Small, western-type shipping melon. Heavy netting</td>
<td>PM$_{1,2}$</td>
</tr>
<tr>
<td>Jenny Lind</td>
<td>Muskmelon</td>
<td>70</td>
<td>Round fruit with heavy netting. Green flesh. Large blossom scar. Heirloom melon.</td>
<td>-</td>
</tr>
<tr>
<td>Galia 152</td>
<td>Galia</td>
<td>80</td>
<td>Round fruit with green flesh. Very aromatic. No sutures.</td>
<td>PM$<em>{1,2}$ F$</em>{0,1,2}$</td>
</tr>
<tr>
<td>Galileo</td>
<td>Galia</td>
<td>83</td>
<td>Round fruit with green flesh. Light netting.</td>
<td>PM$<em>{1,2}$ F$</em>{0,1,2}$</td>
</tr>
<tr>
<td>Arava</td>
<td>Galia</td>
<td>77</td>
<td>Round fruit with green flesh. Light netting.</td>
<td>PM</td>
</tr>
<tr>
<td>Gallicum</td>
<td>Galia</td>
<td>80</td>
<td>Round fruit with green flesh. Small fruit.</td>
<td>PM$<em>{1,2}$ F$</em>{0,1,2}$</td>
</tr>
<tr>
<td>Lavigal</td>
<td>Galia</td>
<td>80</td>
<td>Round fruit with green flesh. Very aromatic. Light netting.</td>
<td>PM$<em>{1,2}$ F$</em>{0,1,2}$</td>
</tr>
</tbody>
</table>
Direct seeding of melons within a high tunnel:
Direct Seeding:

Disadvantages:

More seed required to produce plants.

Not suitable for earliest production.
Mice/ Voles often feed on seed.....
Direct seeding can reduce uniformity.
If early-season yield is the principal objective, transplanting melons is recommended within the high tunnel.

Early-season (before 7/4) yield: 2004
Use deep planting cells (>2.75 inches) for melons.
Four to five weeks are required to grow melon and watermelon transplants.
True leaves

Cotyledons
Transplanting melons in the high tunnel:

- ≥60°F Soil Temperature
- 40-48 inches between rows
- 24 inches between plants
- 8 ft²/ plant
Black plastic mulch warms the soil.

Water stores heat.

9-45-15 Starter Fertilizer

Row Covers (medium wt)
Raised beds increase soil temperatures.

Straw mulch can be used between beds to reduce weed emergence and relative humidity.
Palm-sized, Seedless Watermelons are well-suited for high tunnel production:
High tunnels for cucurbit production should be at least 9 feet high in the center.
Trellising and Pruning
Cucumbers are often trellised in the field to improve quality.
When growing mixed vegetables in the high tunnel, trellising is essential to control vine growth!
Types of Trellises:

- Wire
- String
- Mesh wire or netting
Cattle panels can be used to trellis cucumbers in the high tunnel.
Most melon trellises should be 7-8 feet high.
Pruning:
lateral
Prune to 2 strong laterals / plant.
Small, mesh bags can be used to support the growing fruit on each trellis.
Pollination

Cross pollination is very critical for melon number and size/size melon.
High Tunnel Roof Vent
Pests
Powdery Mildew
12 spotted cucumber beetle

Striped cucumber beetle

Leaf feeding injury

Bacterial wilt
Thrips can be found on the underside of leaves.
Thrips cluster in melon flowers, feeding on pollen.
Melon Aphid
(*Aphis gossypii*):
(0.1 ounces per 1000 plants)
White Flies
Two-Spotted Spider Mite
Potential Marketable Yields:

1000-1500 melons per 3000 ft$^2$ high tunnel.
High Tunnel
Melon and
Watermelon
Production

University of Missouri Extension
High Tunnel Strawberries
Annual strawberry production using a high tunnel
12 in. between plants

12-15 in. between rows
2 drip lines per bed.
1500-2000 strawberry plants per commercial high tunnel

5 ft. wide black, embossed plastic
Have the soil tested prior to planting strawberries within a high tunnel.
If compost is used as a soil amendment, have it tested for nutrients, pH and soluble salts.
Salinity damage to strawberry
Plant Sources:
Some Strawberry Plant Suppliers

Jersey Asparagus Farms
105 Porchtown Rd.,
Pittsgrove, NJ 08318
856-358-2548

Nourse Farms, Inc.
41 River Rd.,
South Deerfield, MA 01373
413-665-2658

Krohne Plant Farms
65295 CR 342
Hatford, MI 49507
269-424-5423

Ruby Mountain Nursery
24244 Hwy. 371
La Jara, CO
(719) 587-0540

Strawberry Tyme Farms
R.R. #2 Simcoe, Ontario Canada
N3Y 4K 1
519-426-3099

Ghesquiere Nursery
Simcoe Ontario Canada
519-428-1087

Goodsen Berry Supplies
Little Rock, Arkansas
501-335-8185

Other strawberry nurseries can be found at: www.ncstrawberry.org
• Runner tips
• Bare root
• Plugs
Chandler
Camarosa
Sweet Charlie
Ventana (?)
Planting date for annual strawberries within a high tunnel is approximately September 20-October 15th for the Central Midwest.
Temperature management is critical for high tunnel strawberries.
Keeping the high tunnel too warm in the fall can trigger flowering of strawberries.
Or runner production.
Row cover usage is precarious!
POLLINATION
Small fruit

Misshapen fruit
Bees significantly increased average berry weight of high tunnel strawberries.

![Bar chart showing the average berry weight for different treatments: Honeybee, Bumblebee, Open, Control. Honeybee has the highest average berry weight, followed by Bumblebee, Open, and Control.]
Harvest frequency of high tunnel strawberries:

- Ounce per row (30 ft.)

Date:
- April 10-18
- April 24
- April 26
- May 4
- May 10
- May 22
- May 25
- June 5
Average yield per plant: 1.2-1.3 lbs of marketable berries per plant.
Thank you, and please visit the high tunnel web site:

Hightunnels.org