Managing Diseases in High Tunnels
Dan Egel, SW Purdue Ag Center, Vincennes, IN
High tunnels are low-cost, passive, solar greenhouses that use no fossil fuels for heating or venting.
Benefits of high tunnels...

• Season extension
• Protect crop from environment
• Protect crop from pests
• Well suited for heirloom vegetables
• Intensive crop production on small land area
## High Tunnel Disease Management vs. Disease Management in the Field

<table>
<thead>
<tr>
<th></th>
<th>High Tunnel</th>
<th>Field</th>
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</thead>
<tbody>
<tr>
<td>Crop rotation</td>
<td>No difference….see pages 44-45 in ID-56</td>
<td></td>
</tr>
<tr>
<td>Fungicide applications</td>
<td>Restricted</td>
<td>---</td>
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<tr>
<td>Windborne spores</td>
<td>Little or no difference</td>
<td></td>
</tr>
<tr>
<td>Splash dispersed diseases</td>
<td>Some protection offered</td>
<td>---</td>
</tr>
<tr>
<td>Leaf wetness</td>
<td>Higher humidity, plus leaf wetness</td>
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</tbody>
</table>
Crop rotation is important for residue and soilborne diseases.

Residue borne-survives on crop debris (shorter rotations)

Leaf mold of tomato

Soil borne-survives in soil (longer rotations)

Timber rot of tomato
Leaf mold of tomato
Leaf mold management:

- Rotate at least two years
- Control relative humidity by venting greenhouse
- Pruning and spacing.
- Fungicides include copper products, mancozeb
Timber rot
or
White mold of tomato
(soilborne)
Management of timber rot -
• Irrigate in am
• Avoid excessive N fertilization
• Proper K levels
• Cover crops
• Long rotations
• No fungicides are available

Timber rot of tomato
Bacterial canker of tomato (residue-borne)
Bacterial canker of tomato
Bacterial canker management-
• Reduce humidity
• Rotate 3-4 years or more
• Transplants-fixed copper & inspect
• Copper not effective for mature plants

Bacterial canker of tomato
Botrytis gray mold of tomatoes
Gray mold of tomatoes
Managing gray mold of tomato:
• Rotate 2 years
• Reduce humidity
• Lime soils & keep fertility up
• Copper products, Scala
Powdery mildew of tomato
Powdery mildew fungus

Management:
• Rotate 2 years
• Reduce humidity
• Apply fungicides preventatively
Fusarium wilt of watermelon
Fusarium wilt of watermelon
Fusarium wilt of watermelon

Management -
• Long crop rotations
• Partial resistance
• Cover crops?
Fungicide applications are restricted in a greenhouse. ...
... a high tunnel is legally a greenhouse.

- A greenhouse is an enclosed area large enough for a person to enter
- Nonporous covering.

2005 WPS How to Comply Manual
Fungicide labels and the greenhouse

Fungicide labels may…

1. Have a section listing special rates and instructions for greenhouse
2. Mention that a fungicide can be used in greenhouse-no instructions
3. Have no mention of whether the fungicide can be used in greenhouse or not
4. Specifically prohibit greenhouse use.
Fungicide example
1. Label that has specific instructions for the greenhouse.

Copper hydroxide—e.g., Kocide 2000, Champ
Fungicide example
2. Label only mentions that greenhouse use is allowed.

Mancozeb-e.g., Dithane, Mancozeb, Penncozeb
Fungicide example
3. Label has no mention of greenhouse use at all.

Nova, Endura
Fungicide example
4. Label specifically prohibits greenhouse use.

Chlorothalonil—e.g., Bravo, Echo, Equus
Managing diseases in high tunnels:
- Learn to recognize disease symptoms
- Reduce humidity/leaf wetness
- Rotate crops
- Follow good sanitation
- Apply labeled fungicides preventatively
For more information...
High Tunnel Melon and Watermelon Production
Lewis Jett
University of Missouri (now at U. of WV)

http://extension.missouri.edu/explore/manuals/m00173.htm
www.hightunnels.org
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