Organic Insect Management

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Organic Crop Pest Management
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Organic Insect Management

• Principles are the same as conventional IPM (Integrated Pest Management) program
• Only difference is that some options are not available

IPM Principles

• IPM is a system in which a combination of methods is used to maintain pest populations at low levels while allowing for profitable production with minimal adverse effects on the environment

Key Points

• Combination of methods
• Profitable
• Minimal environmental (broadly defined) impacts

IPM Techniques

• Cultural practices
• Host plant resistance
• Biological control
• Chemical control
Cultural Control

- Tillage/cover crops
- Crop refuse destruction
- Time of planting
- Crop rotation
- Row covers
- Irrigation

Host Plant Resistance

- No GMO plants
- Tolerance
- Antibiosis
- Nonpreference
- Trap crops

Biological Control

- Conservation of existing natural enemies
- Importation and colonization
- Mass culture and periodic release
- Biological insecticides – bacteria and viruses

Chemical Control

- No synthetic insecticides
- Synthetic pheromones are allowed

7 Steps to Successful Insect Management

- Avoid the problem
- Correct identification
- Understand pest and crop dynamics
- Monitoring
- Application of economic thresholds
- Control actions
- Evaluation

Diseases-
Dan Egel, SW Purdue Ag Center
Disease Management

• Use disease-resistant cultivars whenever possible.
• Keep foliage dry and encourage air circulation to prevent disease attack.
• Practice good sanitation.
• Rotate when possible to avoid buildup of soil-borne diseases and pests.
• Water as needed/don’t overdo.
• Maintain good fertility.

Tomato Early Blight

<table>
<thead>
<tr>
<th>Disease</th>
<th>Tillage</th>
<th>Seed born</th>
<th>Rotation</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early blight</td>
<td>XXX</td>
<td>No</td>
<td>3-4 yrs</td>
<td>Partial</td>
</tr>
</tbody>
</table>

- Fall tillage will help in control.
- Disease is not seedborne
- Use at least 3 to 4 year rotation.
- Partially resistant plants will have less disease than other varieties.

Pumpkin Virus

<table>
<thead>
<tr>
<th>Disease</th>
<th>Tillage</th>
<th>Seed born</th>
<th>Rotation</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virus</td>
<td>X</td>
<td>No</td>
<td>NA</td>
<td>None</td>
</tr>
</tbody>
</table>

- Fall tillage is not effective.
- Disease is not seedborne
- Rotation is not useful.
- No resistance available.
- Plant early (June 20); fruit set will occur before virus is severe (cultural control).

Watermelon Fusarium Wilt
**Fusarium wilt of watermelon-soilborne**

<table>
<thead>
<tr>
<th>Disease</th>
<th>Tillage</th>
<th>Seed</th>
<th>Rotation</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fusarium wilt</td>
<td>XX</td>
<td>Yes</td>
<td>6 years</td>
<td>Partial</td>
</tr>
</tbody>
</table>

- Fall tillage will help.
- Saving seed from a diseased plant could result in disease next year.
- Long rotations are necessary since fungus survives in the soil as well as in the residue.
- Partial resistance is available.

**Allowed Fungicides**

- Apply before disease appears
- Soaps/Oils
- Baking Soda (see ATTRA)
- Biofungicides e.g. AQ10 for powdery mildew, Serenade for several fungal diseases.
- Inorganic chemicals e.g. sulfur, lime-sulfur, copper, Bordeaux mix
  - Can harm beneficials, potential phytotoxicity

**Weed Management**

**NOP Standards**

- Prevention
- Control: cultivate, mulch, flame, mow, graze
- IF above are not enough, may apply
  - Biological or botanical materials
  - Allowed synthetic materials
  - Must document conditions for use
Prevention

• Crop rotation, soil management
• Sanitation
• Cultural practices

Winter rye cover suppresses weed growth in fall and spring

Prevention - Cultural Practices

• Increase crop competitive ability

Buckwheat reduces weed growth and flowering

Sorghum sudangrass is a vigorous summer cover crop.

Weed Control Methods

• Cultivation and handweeding
• Mulch
• Heat: flame, electricity, etc.
• Mowing
• Grazing

Cultivation and Handweeding

• Soil tilth
• Equipment
• Skill
• Experience
Cultivating Equipment

- Rotary hoe
- Flex tine weeder (e.g. Lely)
- Basket weeder
- Finger weeder
- Bezzerides tools (spyders, spring hoes, torsion weeders)
- Rolling cultivator
- Sweeps, shovels, discs

Mulch

- Biodegradable
  - cover crop residue
- Synthetic
  - paper (check composition)
  - straw
  - plastic

Flaming is often used to kill weeds in a stale seedbed before planting salad greens

Mowing or Grazing

Biological or Botanical*
Substances

ex. Vinegar, Clove oil, Thyme oil
note: Pesticide Regulations Apply!

*Or allowed synthetic substances

Weed Management
Long Term Strategy

Do everything possible to reduce number of seeds in the soil!
• Cultivation, flaming, handweeding
• Use competitive cash crops and cover or smother crops
• Vary timing of tillage and cultivation
• Promote biological activity