Insect Management in Pumpkins

Southeastern U.S. Vegetable Handbook
http://www.thegrower.com/south-east-vegetable-guide/

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The University of Tennessee
WTREC, Jackson

http://themetapicture.com/smashing-pumpkin/
Arthropod Pests

Common problems
• Squash bug
• Squash vine borer
• Cucumber beetles

Less common but ...
• Spider mites
• Pickleworm and melonworm
• Aphids
• Cutworms
• Loopers
• Beet armyworm
• Thrips
• Whiteflies

http://www.organicgardeninfo.com/
Squash Bugs

- A true bug
  - Sap feeder with piercing-sucking mouthparts

University of Minnesota

http://www.divine-journeys.com/
Squash Bug Biology

- Overwinter as adults
- Small nymphs are initially dark red with a light green abdomen (before turning gray)
- Feed mostly around base of stems and on the undersides of leaves
- Two overlapping generations per crop are possible
- May vector the pathogen responsible for yellow vine disease

http://keystonegardening.blogspot.com
Squash Bug Management

- Begin monitoring for egg masses after emergence through mid flowering
- Suggested treatment threshold is 1 egg mass per plant or when adults or nymphs are present
  - Time insecticides to control small nymphs
  - Multiple applications are often necessary
- Insecticide options
  - Pyrethroids (multiple), PHI 0-7 Days
  - Acetamiprid (Assail), PHI 0 Days
  - Clothianidin (Belay), PHI 21 days
    - At-plant soil application and foliar
  - Dinotefuran (Venom), PHI 1 Day

http://everythingishomemade.com/
Squash Vine Borer

- Clearwing moth
  - Larval stage has chewing mouthparts

[Image of Clearwing moth and larval stage]


University of Minnesota
Squash Vine Borer Biology

- Overwinter as full grown larvae or pupae in soil
- Adult emergence coincides with “running” of vines
- Larvae tunnel within vines
  - Vines typically die beyond point of attack
- Moth flights may continue through August
  - Two generations are likely

University of Connecticut
http://gardeninggals.com/
Squash Vine Borer Management

- Must control larvae before they enter the stem
  - Pheromone baited sticky traps to detect adults
  - Check for the presence of eggs
  - Monitor vines weekly for initial signs of infestation
    - Frass at entrance holes
- Insecticide applications (2-4) at 7-day interval are often suggested
  - Good coverage is important
  - Preventative insecticide application when vines begin to run
    - Pyrethroids (multiple)
    - Acetamiprid (Assail)
Cucumber Beetles

- Striped and spotted species
- Chewing mouthparts - feed on foliage, flowers, and the surface of fruit
  - Larvae feed below ground on roots (a less important problem)
- Transmission of bacterial wilt is a major issue for muskmelon and cucumber growers (but not pumpkins)
Cucumber Beetle Management

- Begin monitoring for adults once seedlings emerge
  - Treatment on non-fruiting plants is only needed if adults are unusually common
  - As fruit begins to develop, treat as needed to prevent scarring of pumpkins
- Insecticide options
  - Pyrethroids (multiple products)
  - Carbaryl (Sevin), PHI 3 days
    - Phytotoxicity possible during hot, humid weather
  - Clothianidin (Belay) and Dinotefuran (Venom)
    - Including at-plant, soil application or foliar (see labels)
  - Imidacloprid (Admire Pro, etc.) - soil application only
## Pyrethroid Options for Pumpkins

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Pre-harvest Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-Cyfluthrin (Baythroid XL)</td>
<td>0</td>
</tr>
<tr>
<td>Bifenthrin (Brigade)</td>
<td>3</td>
</tr>
<tr>
<td>Cyfluthrin (Tombstone)</td>
<td>0</td>
</tr>
<tr>
<td>Esfenvalerate (Asana XL)</td>
<td>3</td>
</tr>
<tr>
<td>Fenpropathrin (Danitol)</td>
<td>7</td>
</tr>
<tr>
<td>Lambda-Cyhalothrin (Warrior II)</td>
<td>1</td>
</tr>
<tr>
<td>Permethrin (Pounce)</td>
<td>0</td>
</tr>
<tr>
<td>Zeta-Cypermethrin (Mustang Max)</td>
<td>1</td>
</tr>
</tbody>
</table>

“Generic” versions marketed under other trade names may also be labeled.
Some “Caterpillar” Chemistry

- For control of loopers, corn earworm, beet armyworm, pickleworm and melonworm
  - Chlorantraniliprole or rynaxypyr (Coragen) as drip or foliar $^{1,2}$
  - Flubendiamide (Synapse) $^{1,2}$  This product has been cancelled
  - Indoxacarb (Avaunt) $^{2}$
  - Methoxyfenozide (Intrepid) $^{2}$
  - Spinetoram (Radiant) $^{2}$
  - Pyrethroids (multiple) $^{3}$

1. New MOA providing excellent residual control
2. Not recommended for squash vine borer
3. Not recommended for soybean looper or beet armyworm
Pickleworms and Melonworms

http://davesgarden.com/

Gus Lorenz
Some Aphid Chemistry

- Acetamiprid (Assail)$^{1}$
- Clothianidin (Belay)$^{1}$
  - Soil application at-plant only
- Flonicamid (Beleaf)
- Pymetrozine (Fullfill)
- Pyrethroids (multiple)
- Thiamethoxam (Platinum)$^{1}$
  - Direct seeded, at-transplant, drench (see label)
  - “Actara” only for foliar application
- Imidacloprid (Admire Pro, etc.)$^{1}$
  - Soil application only at-planting, post-seeded drench, transplant water or hill drench (see label)

$^{1}$ Resistance to neonicotinoids now commonly observed in cotton
Some Whitefly Chemistry

- Acetamiprid (Assail)
- Buprofezin (Courier)
- Pyriproxifen (Knack)
- Spiromesifin (Oberon)
- Thiamethoxam (Actara)
- Dinotefuran (Venom), Thiamethoxam (Platinum) and Imidacloprid (Admire Pro, etc.)
  - For at-plant, soil application and drench applications (see labels)
  - Venom is also labeled for foliar application

http://www.flickr.com/photos/usdagov/
Spider Mite Chemistry

- Abamectin (Agri-Mek, etc.)
- Bifenazate (Acramite)
- Spiromesifin (Oberon)

Usually the twospotted spider mite
## Softer Options ... Organic

<table>
<thead>
<tr>
<th>Insect</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aphids</td>
<td>Strong spray of water; Insecticidal soap; Neem</td>
</tr>
<tr>
<td>Cucumber beetle</td>
<td>Insecticidal soap; Pyrethrins, Neem; Soil drench of parasitic nematodes (weekly) to control larvae</td>
</tr>
<tr>
<td>Squash bug</td>
<td>Hand remove adults; Provide a board for them to hide and then hand collect</td>
</tr>
<tr>
<td>Squash vine borer</td>
<td>Tolerant varieties; Cover plants with floating row covers until female flowers are present and then use insecticidal soap, pyrethrins or BTK; Injecting parasitic nematodes</td>
</tr>
</tbody>
</table>

Almost by default, insecticides labeled for fruit and vegetable crops are inherently safe to mammals and sometimes quite selective to specific insect groups

- Spectrum of control varies considerably among insecticides
- E.g., pyrethroids are broad spectrum and may induce outbreaks of some pests
New Insecticide

- Sivanto 200 SL or Sivanto prime
  - Bayer CropScience
  - Soil applications
    - Aphids, whiteflies and leafhoppers
    - Use rate varies from 21-28 oz/acre
    - PHI = 21 days
    - Label allows for chemigation, drench
  - Foliar applications
    - Aphids and leafhoppers (7-10.5 oz)
    - Squash bug and whiteflies (10-5-14 oz)
    - PHI = 1 day
Conserve beneficial insects when possible
Honey Bees and other pollinators

- Bees are important for yield, fruit size and quality
- When possible, apply insecticides during the evening hours (when blooms are closed)
- Avoid, where possible, broad spectrum insecticides
  - Little known impact on bees
    - Coragen
    - Fulfill
    - Synapse
    - Knack
    - Intrepid
    - Beleaf
    - Radiant
    - Avaunt
    - Most miticides
Brown Marmorated Stink Bug

- An invasive threat that is now well established in East Tennessee and the Nashville area
- Wide host range
  - Likely impact on pumpkins and other cucurbits is not well known, but it is a reported pest of cucumber
Questions?