IPM (Integrated Pest Management)

- An ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms, and the environment.
Pesticides are highly regulated by the EPA

- All pesticides must be registered by the EPA
- Involves product and environmental testing 4 or more yrs
- Takes 7-10yrs and 15million
- Tolerance established for every crop
  - MRL = maximum residue level
  - PHI = Pre-Harvest interval
  - REI = Restricted-entry interval
Types of pesticides

• Chemical substance used to manage weeds
  • Herbicide
    ![Gramoxone](image)

• Chemical substance used to control insects
  • Insecticide
    ![Mustang Max](image)

• Chemical Substance used to control plant diseases
  • Fungicide
    ![Pristine](image)

How do pesticides work?

• Pesticides work in different ways
  – Interfere with a biological process necessary for life

• Contact- pest must be contacted by pesticide
• Ingestion-pest must eat pesticide
• Systemic/translocated-pesticide is absorbed in plant and moves throughout the entire plant

• Selective
• Non selective
• Residual
• Non-residual
Pesticides: Certification

- Private applicator certification will vary from state to state
  - Must be certified to purchase RUP
- WPS
- Arkansas: For more information on WPS standards or applicator training contact Ples Spradley: psspradley@uaex.edu

Pesticides: Resistance Management

- Only use pesticides when necessary.
- Use the appropriate material for the pest.
- Use the recommended rate of the material.
- If more than one treatment is needed when the same pest is present, rotate pesticide mode of action (MOA, IRAC, FRAC) between treatments. Numbers are listed in Integrated Management Guide in your binder.
Resistance Management

Pre-Transplant/Transplant
Disease Management

- Destroy wild brambles within 600 ft of commercial production
- Locate planting in direct sunlight with adequate air circulation
- Purchase plants from a reputable source: TISSUE CULTURE
- Do not plant immediately after eggplant, tomato, potato to avoid verticillium infection
  - 3-4 yrs with a non-vert crop

Virus and Crown Gall

- No cure except removal of symptomatic plants.
- Tissue-cultured plants are more likely to be free of virus and crown gall.
- Destruction of wild blackberries
- Nematode control, especially of dagger nematode.
Nematodes

1. Can directly destroy roots

2. Nematode damage can increase crown gall

3. Many nematodes spread bramble viruses
dagger nematodes especially problematic

Control- Telone (preplant only)

Virus and Crown Gall Cultural Mgmt

• Virus and crown gall enter through a wound on the plant
• Minimize wounds on lower canes and roots
  – Avoid cultivation for weed control
  – Avoid using weed eater close to plant base
  – Avoid herbicide damage: Gramoxone
• Prune plant when 2-3 days of sunny weather is predicted
  – Sterilize pruners after each plant to prevent cross contamination
  – Rubbing alcohol (70% isopropyl): 50% solution (1 part alcohol + 1 part water)
Crown Gall Biological Control

• Dip root cuttings in Galltrol or Nogall suspensions.

• One 100g pack of Nogall, when mixed into slurry with 1 gallon of water, treats up to 2,000 cuttings.
  – $20 per 100g

Phytophthora, Root Rot: Cultural Mgmt

• Prima canes wilt and shoot tips die back
• Floricanes have weak lateral shoots and leaves turn yellow or scorch around margins
• Root rot is generally a problem of low, poorly drained sites.
  – Provisions for adequate drainage must be made prior to planting!
• Treatment with fungicides is not effective for reversing root rot damage on plants with severe symptoms.
  – Chemical management: mefenoxam (Ridomil) and fosetyl (Allette)
Dormant

Disease: Anthracnose

• Major disease in the southeast
  – Fungus overwinters in old canes
  – Spores spread by pruners, wind, rain etc.

• Cultural Management: Remove floricanes and infected primocanes
  – Destroy canes (burn or bury)
Disease: Anthracnose

Insects

- Raspberry cane borer and rednecked cane borer – Infested canes should be destroyed during winter pruning
Blackberry Susceptibility to RNCB

![Graph showing blackberry susceptibility to RNCB.](image)

Raspberry Crown Borer

![Image of raspberry crown borer and damage.](image)
Insects

- Raspberry Crown Borer (RCB)
- Dormant: Remove floricanes and infested canes
- Chemical Management: FALL application of Asana, Altacor, Brigade, or Sniper
  - Apply with at least 50 gallons of water per acre
  - Use flood nozzle to apply continuous band directed at the base of the plants

Timing is everything....

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Rate</th>
<th>% Reduced 23 Oct. 2003</th>
<th>% Reduced 6 May 2004</th>
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<tr>
<td>Untreated Control</td>
<td>27.8 ± 4.05 a</td>
<td>19.6 ± 3.54 a</td>
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<tr>
<td>GF-968</td>
<td>105.1 g/ha</td>
<td>18.4 ± 3.09 a</td>
<td>6</td>
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<tr>
<td>S. feltiae²</td>
<td>60,000 IJ/crown³</td>
<td>19.2 ± 5.62 ab</td>
<td>16.2 ± 3.05 a</td>
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<td>S. feltiae¹</td>
<td>1 cadaver/crown³</td>
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<td>14.2 ± 2.62 a</td>
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<td>Novaluron 10 EC</td>
<td>1122.9 ml/ha</td>
<td>11.4 ± 4.77 bc</td>
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<td>Guthion Solupak</td>
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<td>Lorsban 4 E</td>
<td>1186.1 g ai/ha</td>
<td>1.4 ± 1.40 cd</td>
<td>16.8 ± 1.66 a</td>
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<td>Brigade WSB</td>
<td>112.1 g ai/ha</td>
<td>0.2 ± 0.20 d</td>
<td>13.2 ± 2.62 a</td>
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</table>
Disease: Anthracnose

- Anthracnose: Timing of fungicide sprays is critical.
- Spray at green tip, no more than 3/4” green tissue visible
  - Additional applications: primocanes 6” tall and again at 14-day intervals through harvest.
- Chemical Management (delayed dormant): Copper compounds, lime sulfur, Sulforix
Insect: Fire ants

• Use a granular product registered for cropland: Extinguish or Esteem Ant bait.

Weed Management: Prep/Dormant

• Landscape fabric
• Mulch
• Site preparation: Burndown all weeds with Glyphosate (Before plants are in the ground)
• Pre-emergent herbicide: Apply before weeds emerge (lasts 6-8 weeks)
  • Ex. Devrinol, Surflan, Oryzalin
• Be sure to follow the crop age restrictions