Integrated Crop Management for Vineyards

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Vineyard Pest Management

Disease and Insect Management for New Vineyards

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Vineyard Pest Management

IPM/SVP/ICM Program Components
A “Whole Plant Health Care Plan”

- **Cultural Practices**
  - site selection
  - site preparation
  - soil management
  - cultivar selection
  - cultural practices
    - canopy management
    - nutrition

- **Disease/Insect Management**
  - monitoring/trapping
  - forecasting
  - control choices
    - pesticides/mating disruption

- **Weed Management**
  - cultivation
  - cover crops

- **Other Pests - vertebrates**
  - birds, deer, racoons
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“The most important thing you can put into the vineyard is your footprints!”
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Proximity to Woods

Increased pressure from:
- Wildlife
  - habitat
- Insects
  - wild vines
- Diseases
  - reduced air movement
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Bio-Renovation Program

http://www.grapesandfruit.umd.edu/Pages/biorenovationsmallfruitsfs.pdf

- Increase organic matter
  - Nutrition
    - Nitrogen and nutrient holding capacity
    - Herbicide efficacy
- Reduction/elimination of residual herbicides
  - Adsorption of herbicides
- Reduction of plant pathogenic nematodes
  - Direct competition
  - Vector of virus diseases
- Control perennial weeds
Nematode Damage

- **Left**: grapevine roots damaged by lesion nematodes
- **Right**: a healthy root system

Clean vine Certification Program

Start with certified “clean” vines

Leaf Roll Virus

Crown Gall - Agrobacterium

Vine Decline
Petri Disease
“Black Goo”
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Pathogens of Grapes

- Fungi (Major diseases)
- Bacteria
  - Crown gall
    - Ubiquitous; nursery stock
  - Pierce’s Disease
    - Southern and Eastern shores
- Viruses
  - Leafroll, Tomato Ringspot
- Phytoplasmas
  - (grapevine yellows)
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Major Grapevine Diseases in the Mid-Atlantic

- Black Rot
- Powdery Mildew
- Downy Mildew
- Phomopsis
- *Botrytis* and Late Season Rots
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Black Rot
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Black Rot
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Powdery Mildew
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Powdery Mildew
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Downy Mildew
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Downy Mildew
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Botrytis

Single infected berry. Inset shows sporulation on cap stem and infected berry.
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Late-Season Rots

- Ripe Rot
- Bitter Rot
- Sour Rot
- Macrophoma Rot

Photos: James W. Travis, by permission
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Grape Disease Management Season in Mid-Atlantic

Risk Period for Disease

- Budbreak
- Pre-bloom
- Bloom
- Post-bloom
- Bunch closing
- Veraison
- Pre-harvest

Phenology

- Black rot
- Phomopsis
- Late-season rots
- Botrytis bunch rot
- Downy mildew
- Powdery mildew
Benefits of Proper Canopy Management

Decreased Disease

- Early drying of canopy – air movement
- Increased penetration of pesticides
- Improved coverage of pesticides
- Earlier ripening
### Vineyard Pest Management

**Spray Program - Non-Bearing Vineyard**

<table>
<thead>
<tr>
<th><strong>Timing</strong></th>
<th><strong>Target</strong></th>
<th><strong>Materials</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>New shoots (start at $\frac{1}{2} - 1&quot;$) Every 10 days (6 sprays)</td>
<td>Powdery mildew Downy mildew</td>
<td>Mancozeb <strong>plus</strong> a PM fungicide (sulfur, oil, an SI, Quintec, Endura)</td>
</tr>
<tr>
<td>Cover sprays Every 14-21 days until frost</td>
<td>Powdery mildew Downy mildew</td>
<td>Mancozeb <strong>plus</strong> PM fungicide (sulfur, an SI, Quintec, Endura)</td>
</tr>
<tr>
<td>Jul-early Aug</td>
<td>Japanese beetle</td>
<td>Add Sevin</td>
</tr>
</tbody>
</table>
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Grape Berry Moth

Grape Berry Moth Adult Males
Trap Collection - 1988
South Jersey

Male GBM in 9 pheromone traps

20
15
10
5

June 28 July 6 13 20 27 Aug 3 9 16 26

Total male moths from 3 vineyards
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Grape Root Borer

Grape Root Borer Males

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Japanese Beetles
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- Native to China, Japan, Korea, and Taiwan.
- Broad host range including many important agricultural crops such as tree fruit, small fruit, legumes, vegetables, and ornamentals.
- Typically 2 generations per year (up to six)
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Photos courtesy of Doug Pfeiffer and Dean Polk
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Other Insects

Multicolored Asian Lady Beetles

Grape Leafhopper

Grape phylloxera

MALB
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Protect Beneficial Insects

Lady Beetles
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Sprayer Types

Air-blast

Re-circulating boom/air-blast
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Reference Materials

- *Guidelines for Developing an Effective Fungicide Spray Program for Wine Grapes in Maryland, 2012* - (section on non-bearing vineyards)
- *A Pocket Guide for Grape IPM Scouting (North Central & Eastern U.S.)*
- *Home Fruit Production Guide, MD EB 125.* Available for $8.00+ S&H from UMD Home & Garden Info Center: www.hgic.umd.edu
- Other University pest management guides (Cornell-Penn State, Virginia Tech)—commercial and home gardening
- Dr. Wayne Wilcox, Cornell—annual notes on disease control
- Dr. Andrew Landers, Cornell – book on vineyard sprayers
- *APS Compendium of Grape Diseases*
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