Grape Insects in Organic Vineyards

- Grape flea beetle-10%
- Grape phylloxera-10%
- Leafhoppers-50%
- Japanese beetles-20%
- Lepidopteran larvae
  - Climbing cutworms, grape leaf skeletonizer, hornworm, forester-20%
- Grape berry moth
- Grasshoppers
- Mites

Grape berry moth (top) and larva (bottom)
Mite damage
Leafhopper and damage
Insect Pest Management

• Prevention of pest problems through:
  – Crop diversity (host-masking)
  – Flowering plants (insectary plants) attract predators and parasitic wasps
  – Insect-, disease-, nematode-resistant varieties

• Low-toxicity insecticides
  – Botanicals: neem, pyrethrum, sabadilla, ryania
  – Soap products; diatomaceous earth (D.E.); kaolin clay

• Biological Controls (sprays)
  – *Bacillus thuringiensis* (*B.t.*) natural bacteria spray
  – *Bacillus popillae* (milky spore)-Japanese beetle
Organic Grape Insect Management: Biological Control

- *Trichogramma* wasps: egg parasite of GBM
- *Anagrus* wasps: egg parasite of leafhoppers
- Univ. of Calif. research found increased suppression of leafhoppers, spider mites, and ants (which limit bio-control of aphids and mealybugs) with cover crops, such as vetch/rye, oat/vetch

Sweet alyssum and crimson clover
Insect Management: Mating Disruption

- Grape berry moth (GBM): 240-400 pheromone ties/acre
- Grape root borer (GRB): 100 ties/acre

Photo Credits
Left: Michigan State University
Right: Cornell University
Cultural/Physical Methods

- *Botrytis*: Reduce fertilization and Pruning: create more air flow by selecting varieties with loose clusters; remove leaves around grape clusters
- Insect-disease connection: mitigate berry moth to lower *Botrytis* infection
- Ridge soil against vines 30-45 DBH; pull out into centers and disk in cocoons
- Netting over fruits for protection against birds/ wasps-20%
- Irrigation: keep dust down to prevent mites

[Netting over fruits image]
Grasshoppers

- Controls:
  - Trap cropping
  - *Nosema locustae*
  - *Beauvaria bassiana*
  - Neem, or pyrethrum against early instars?

Slide courtesy of Eli Bergmeier, Golden Hills RC&D
Organic Grape Disease Management

- Black rot
- Downy mildew
- Powdery mildew
- *Phomopsis* cane and leaf spot
- Anthracnose

![Black rot](image1)

![Downy mildew](image2)

![Powdery mildew](image3)

![Anthracnose](image4)

![Botrytis Bunch rot](image5)
Organic Grape Disease Management

• Maintain healthy, vigorous growth in plants-100%
• Disease/insect (phylloxera)-resistant varieties-100%
  – *V. aestivalis*, *V. labrusca* or *V. labrusca* hybrids
• Pruning: maintaining air flow through canopy (40% gap through canopy: VSP can open canopy)-70%
• Sanitation (clean up dead/infested material)-60%
  – Hand-pick insects/prune out diseased parts
Biological Control-Diseases
(no current reported use in Iowa)

- **Antagonistic competitors:**
  - *Trichoderma harzianum* (T22 Planter Box™) against *Botrytis*
  - AQ-10 (*Ampelomyces quisqualis*) against powdery mildew
Grape Pruning Workshop

- April 3, 2004
- 10 AM
- Neely-Kinyon Farm
- Greenfield (Hwy. 25)
- Eli Bergmeier, Golden Hills
- ISU Organic Ag. Program
- Neely-Kinyon Farm Association

Bring pruners, warm clothes and a sense of humor!