Organic Management for Diseases & Weeds

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Most Common Diseases and Weeds in Vineyards of Northern California

Weeds

- A ‘weed’ is any unwanted plant
- Many weed species in one farming system are considered desirable in a different system
- These are often controlled chemically and/or mechanically
- They can also be great benefits to improving soil structure and soil organic carbon content

Invertebrate Pests

- There are many invertebrate pests in vineyards

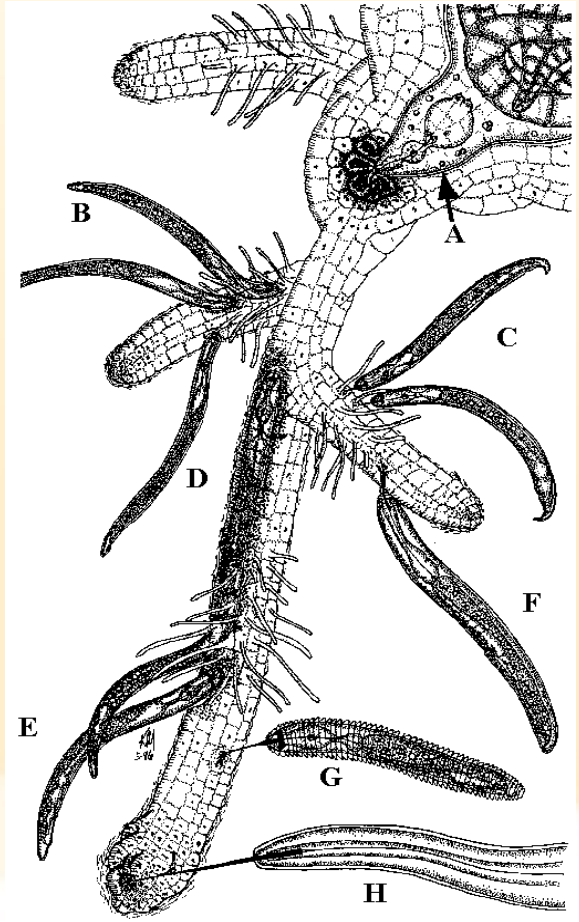
- They can be separated into two main categories:
  1. Phytophagous insect pests
     Feed on plant tissue
  2. Insect vectors of diseases
     Transmit a causal agent of disease to the plant

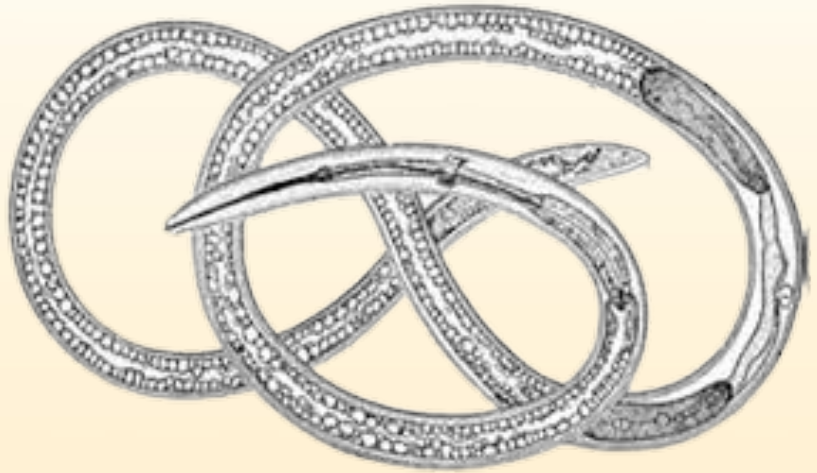
Most Common Phytophagous Insect Pests

- Nematodes
- Mealybugs
- Leafhoppers
- Sharpshooters
- Borers
- Mites
- Plant-Hoppers
- Grapevine Phylloxera

Most Common Insect Vectors

- Nematodes
- Mealybugs
- Leafhoppers
- Sharpshooters
- Plant-Hoppers



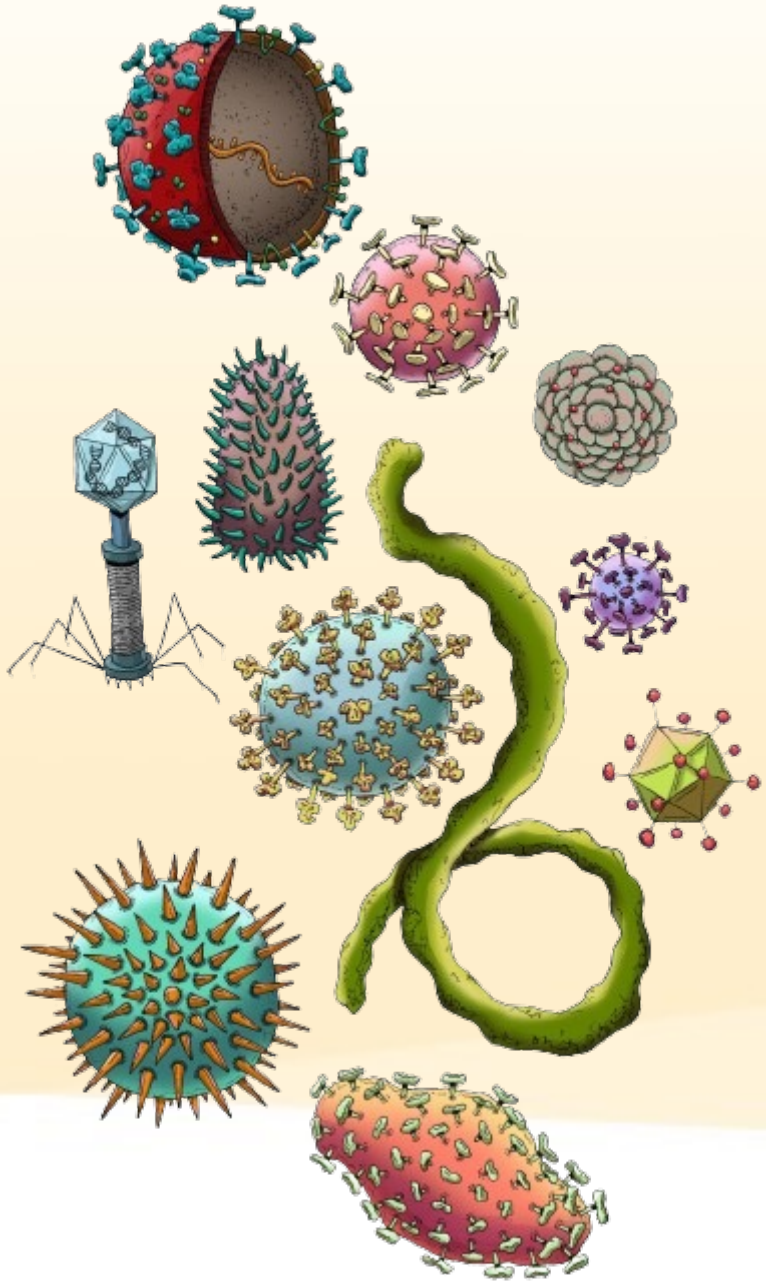


Vineyard Diseases

- Main kingdoms associated with plant diseases
  1. Viral
  2. Bacterial
  3. Fungal
- Many diseases impact the vascular system of the plant
- Many diseases are vectored by an invertebrate pest

Viruses

1. Many kinds of viruses
2. The most common problems are the “associated Virus” groups
3. No cure & No immune system
4. Often impact fruit sugars



Virus Categories

Viruses are often grouped into categories based on what they do

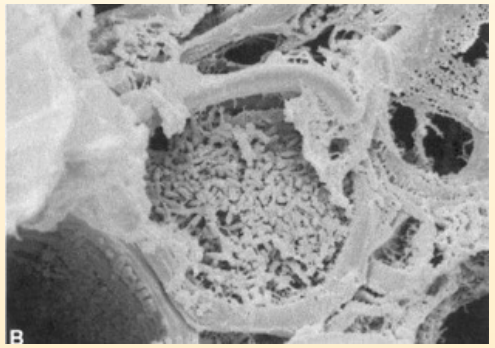
These are referred to as "**associated viruses**"

1. Red-leaf viruses
   - Leafroll (Grapevine Leafroll Associated Virus; GLRaV)
   - Red Blotch (Grapevine Red Blotch Associated Virus; GRBaV)
   - Syrah Decline (Grapevine virus A = suspected virus)
2. Rugose Wood Complexes
   - Rupestris Stem Pitting (Rupestris stem pitting associated viruses; RSPaV)
   - Corky Bark (Grapevine virus B)
3. Fanleaf Virus (Grapevine fanleaf virus; GFLV)

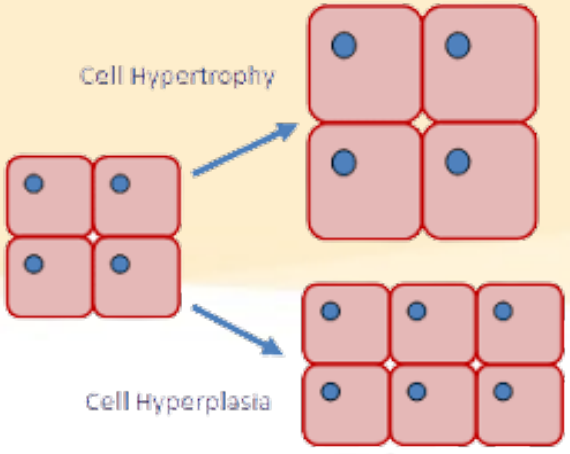
Bacteria

Two main bacteria of concern

1. Pierce's Disease (*Xylella fastidiosa*)
    - Infects and multiplies INSIDE the xylem vessels
    - Vectored by Sharpshooters



2. Crown Gall (*Agrobacterium tumefaciens*)
    - Can result in damaged tissue or cracked trunks/cordons if vine is coming out of dormancy and a freeze event hits
    - Found EVERYWHERE in soils



Fungi

Maybe the most common pathogen type in vineyards

- Most require wet conditions to spread
- Spring is the best time for proliferation

Main fungal diseases are:

- Trunk and permanent wood fungi
- Mildews (Powdery & Downy)
- Root Rot (*Armellaria* sp.)
- Bunch Rot (Botrytis, Sour)

Many fungi infect more than one tissue type, but are more visible on one

Integrated Pest Management (IPM)

IPM Defined

Definition:

a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks.

Key Tenants:

1. Identifying the pest
2. Monitoring and assessing the population size, damage, and favorable conditions
3. Using economic injury thresholds to determine when management is needed
4. Preventing pest problems
5. Combining management methods (biological, cultural, physical, chemical)

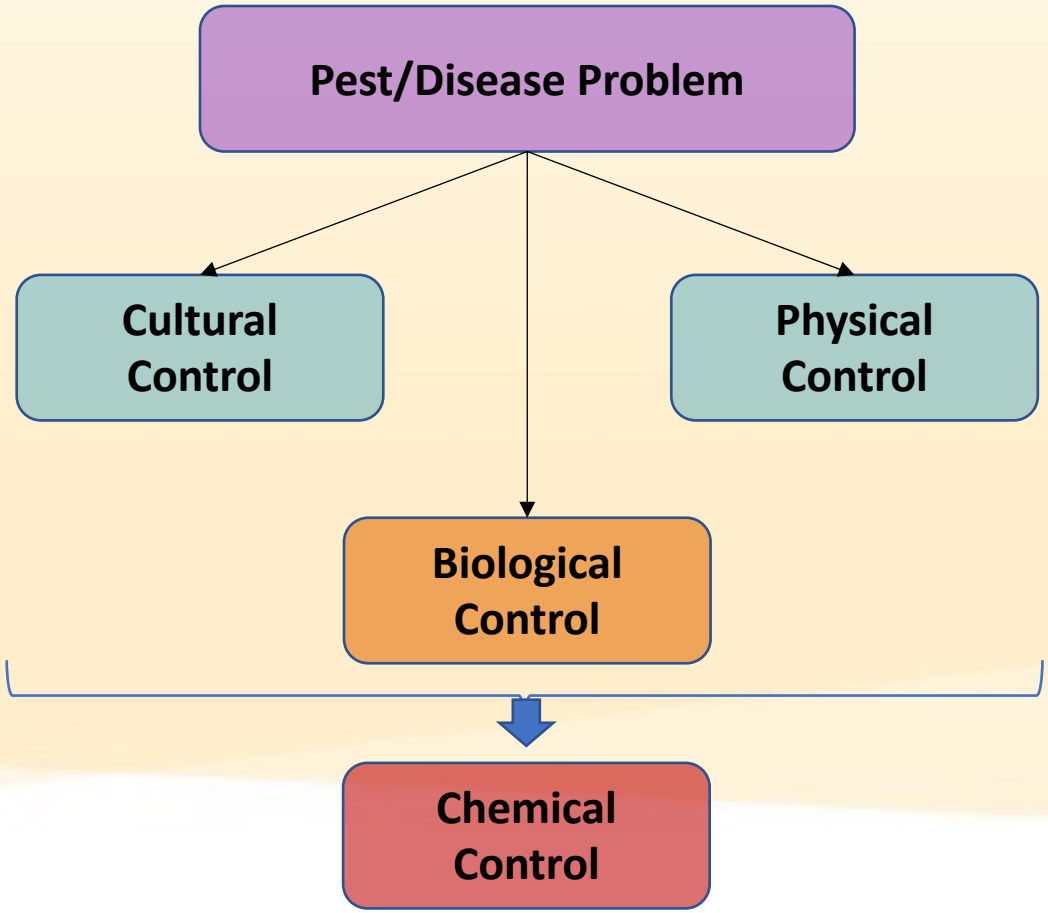
Integrated Pest Management (IPM)

Est. 1959 but really took off in the 60s

IPM is a foundational pillar of sustainable agriculture

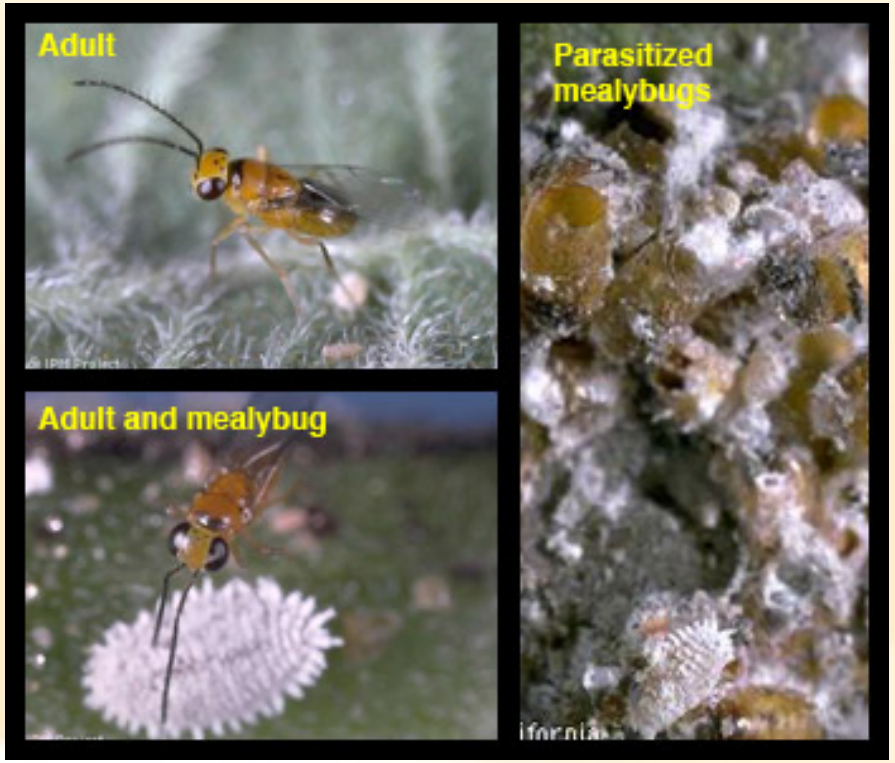
Utilized practices:

1. Cultural
2. Physical
3. Biological
4. Chemical



IPM in Organic and Conventional Vineyards

- IPM looks similar in organic and conventional vineyards
- Alternatives to chemical controls should be explored before resorting to pesticide applications when using IPM
- Often the difference between organic and conventional IPM becomes apparent when chemical pesticides are used on site



Cultural Controls

- Practices that reduce pest establishment, reproduction, dispersal, survival
- In organic vineyards cultural control methods are very useful
- Main cultural controls for vineyard pest management
  1. Weeds
     - Tillage and mowing
     - Mulch application
     - Undervine cultivation
     - Cover cropping
  2. Microbial Diseases
     - Resistant cultivars
     - Sanitation
     - Irrigation and fertilization
     - Preventative care,
     - Canopy management
     - Removal of infected tissue

Physical Controls

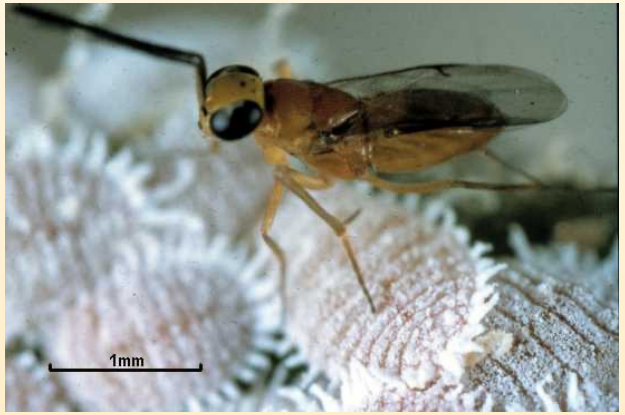
- Any physical changes to the site done in order to control a pest
- These might be
  - Solarization
  - Mulches for weeds
  - Fences or other barriers
  - Pest traps
  - Steam sterilization
  - Tree cones
- Physical controls are widely used in organic vineyards
- New tools may need to be approved for organic use prior to implementation though

Mechanical Controls

- The use of machines to help control a pest in a cropping system; a type of physical control
- These might be
  - Ground cultivation
  - Leaf removal
  - Mowing cover
  - Shoot hedging
- Often these may replace cultural practices already common in vineyards
- Mechanization may help make these practices easier to implement and more likely to happen

Biological Controls

- Biological controls use natural predators and parasitoids to help control a target pest
- Most often used for controlling invertebrates
- Some examples:
  - Gophers ~ Weeds (predatory)
  - Lady beetles ~ Mealybugs (predatory)
  - *Anagyrus* wasp ~ Leafhoppers (parasitism)
  - Lacewings ~ Many pests (predatory)
  - Cover crops ~ Weeds (competition)
  - Raptors ~ Rodents (predatory)



Chemical Controls - Conventional

- Narrow spectrum is the goal
- Many synthetic chemicals target highly-specific pest groups
- Can be more acutely toxic or poisonous to humans and the environment
- Often requires a licensed applicator
- Very effective if used correctly
- READ & FOLLOW THE LABEL

Chemical Controls - Organic

- Often are broad spectrum
- Negatively impact more than the target pest or disease
- May be less acutely toxic/poisonous to humans and environment
- Often less effective than conventional pesticides
- READ THE LABEL

Summary

1. There are many ‘unwanted’ pests in a vineyard

2. Using the principles of IPM, we can control pest populations organically OR conventionally

3. Organic vineyards rely on the use of cultural, physical, and biological controls before resorting to chemical solutions

4. Organic pesticides are often broad-spectrum and can kill off more than the target pest in a field

Thank You

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Sources

You can find this presentation at:

1. https://ucanr.edu/sites/chenlab
2. Speaker Presentations
3. “Other Presentations”
4. “Organic Management for Diseases and Weeds – UC ANR (2024)”

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