Best Practices for Prevention of Pests and Diseases in Vineyards

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Pests and Diseases in Vineyards

- Agricultural systems always come with pests and diseases
- We've been creating new methods of prevention for generations
- Best Practices are the tried-and-true methods, shown to work with some level of repeatability

Main Categories of Pests and Diseases

General categorizations of common vineyard pests:

1. Fungal pathogens of the canopy and fruiting zone
2. Fungal pathogens of the trunk and permanent wood
3. Invertebrate vectors of pathogens
4. Phytophagous invertebrate pests
5. Viral and bacterial pathogens
6. Vertebrate pests

Best Practices – Fungal pathogens

- Unlikely to eliminate the pathogenic species ; Spores everywhere
- Best practices are often a preventative prescription rather than a corrective intervention, but can be both
- Primary strategies for prevention of fungal pathogens
  1. Limiting the spread of the fungal pathogen
  2. Modifying the preferred environment to be more hostile to pathogen

Canopy Fungal Pathogens

- Powdery Mildew is the primary canopy fungal pathogen in CA
  - Prefers dense canopies with high humidity
- Bunch rots prefer similar conditions and high-density clusters
  - Avoid over-cropping and try to space growing points far enough apart

Canopy Fungal Pathogens

- Best practices:
  - **Shoot thinning** – opens the canopy to air flow and light exposure
  - **Leaf removal** – can reduce severity of infection by 32% (Austin & Wilcox, 2011)
  - **Fungicides** – Sulfur, oils, and other fungicides in regular intervals
  - **Crop thinning** – if over-cropped, removing clusters can reduce density

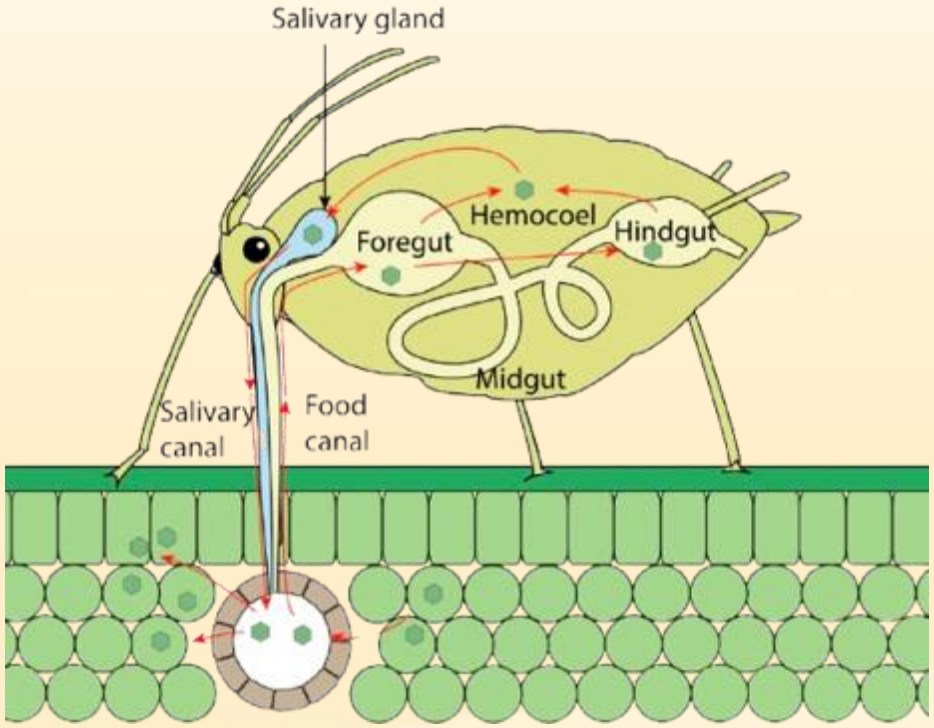
Fungal Grapevine Trunk Diseases

- Common in mature vineyards
  - Esca, Eutypa, Phomopsis, etc.
- No pharmaceutical curing ability once infected
- Preventing initial infection of vines is key
- Best Practices
  - Physical removal of infected tissue through pruning
  - Physical removal of pruned wood from the vineyard to limit inoculum
  - Maintaining clean pruning tools free of inoculum
  - Avoid pruning shortly before or after a precipitation event (spreads)
  - Protect large pruning wounds using a pruning wound protectant

Invertebrate Vectors and Phytophagous Pests

- Two, general categories of invertebrate pests in vineyards
    1. Vectors of viral and bacterial pathogens
    2. Invertebrate pests that feed on plant tissue to damaging levels

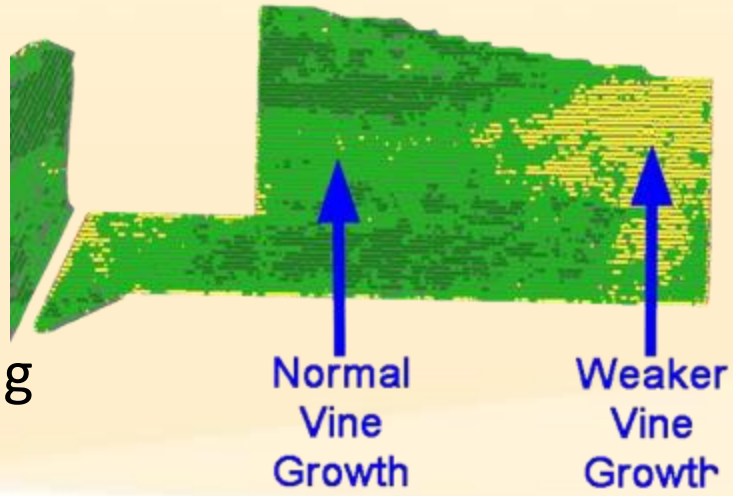
- A single pest can be both



Credit: Viral Zone

Invertebrate Vectors and Phytophagous Pests

- Best practices overlap for vectors and phytophagous invertebrates
  - Understanding the pest's lifecycle
  - Monitoring for signs and symptoms in various tissues
  - Monitoring for pests at appropriate time of year
  - Utilizing techniques to assess population sizes
  - Identify "hot spots" if populations are present
  - Exploring options for limiting population growth using biological control, chemical intervention, or other options
    - These options vary widely from pest to pest and may be specific to each pest



Credit: Lodi Growers and Progressive Viticulture©

Viral and Bacterial Pathogens

- Majority cannot be removed from vine once infected
  - Some options for bacterial “curing” of vines now
- Most viral and bacterial pathogens are vectored by invertebrates
  - Invertebrate prevention strategies also help limit vectored pathogens
- Best Practices
  - Controlling the population sizes of the vectors of the pathogens
  - Monitor vines with symptoms of a microbial pathogen infection
  - Only purchase plants from trusted nurseries and certified virus-free facilities
  - Rogue-and-Replace: Test vines suspected of being infected and quickly remove from vineyard if positive for viral or bacterial infections

Vertebrate Pests

- Many vertebrate pests that damage grapevines
- Best practices vary by pest species
- Common best practices:
  - Deer and large herbivores can be deterred by physical barriers like fences
  - Ground rodents can be trapped for or physically removed
  - Birds can be scared off for a time with various methods
  - True predation of the pest species via a resident predatory species
    - Develop beneficial habitat for local predators
  - Understand the timing of risk during the year for each vertebrate pest

Conclusions

- Novel approaches to pest prevention are developed every year
- Many still require real-world implementation to test efficacy
- Best practices we use today were once new to vineyards too
- Remain open to testing new pest and pathogen management strategies in your vineyard when possible
- The next best practice may be in development right now and will need to be tested in real-world settings to verify its efficacy.

Downloadable Presentation

- You can find this presentation at:
  1. https://ucanr.edu/sites/chenlab
  2. Speaker Presentations

- Accompanying article published in Wine Business Monthly Online

Some original images created by OpenAI Labs Dall-E 3 Program and in https://BioRender.com

Useful Links

The following articles contributed information to this article. They have been provided as accessible hyperlinks for the reference of readers:

1. Mildews - https://ucanr.edu/sites/eskalenlab/files/390126.pdf
2. GTDs - https://ucanr.edu/sites/eskalenlab/files/373935.pdf
3. Pruning Protectants - https://ucanr.edu/sites/eskalenlab/files/318632.pdf
4. Invertebrate Pests - https://ipm.ucanr.edu/agriculture/grape/#gsc.tab=0
5. Viral Diseases - https://ipm.ucanr.edu/agriculture/grape/virus-diseases/#gsc.tab=0
6. Pierce's Disease - https://ipm.ucanr.edu/agriculture/grape/pierces-disease/#gsc.tab=0

Thanks for Listening

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