

## Cross-over Diseases of Hop and Hemp

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#### History of Hemp Production in the United States



#### History of Hop Production in the United States







#### Hop Powdery Mildew Podospharea macularis



- Mating Type 1-1 present in Ohio
- Overwinters in and on crown buds
- Spores dispersed <u>long distances</u> by wind

Fungicides applied throughout the season

#### Sclerotinia Wilt (White Mold) Sclerotinia sclerotiorum

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Hemp



Minor disease of hop

- Overwinters in soil and on plant debris
- Spores dispersed <u>short</u> <u>distances</u> by wind
- Sclerotia moved <u>long</u> distances by equipment and workers

# Hop Hemp

#### Botrytis Grey Mold Botrytis cinerea

- Minor disease of hop in the field most years
- Spores dispersed <u>long distances</u> by wind
  - Spores dispersed <u>short distances</u> by equipment and workers and on plant debris
  - Spores can remain dormant for long periods of time
- Fungicides applied before long periods of leaf wetness (resistance is a major concern)



#### Hop Latent Viroid

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- Asymptomatic in most hop cultivars
- Reduced vigor overtime
- Reduces rooting of softwood cuttings
- Spread <u>short distances</u> by equipment
- Spread <u>long distances</u> via propagation material



#### Hop Stunt Viroid



- Spread short distances by equipment
- Spread long distances via propagation material
- Remove plants immediately after confirmation

### Best Practices for Preventing the Spread of Fungal Pathogens and Viroids

## Preventing the Spread of Fungal Pathogens

- Good cultural practices
- Good sanitation practices (propagation and field)
- Fungicides
- Fungicide resistance management



2020 Hop Disease Management Guide: go.osu.edu/hopsprayguide

## Fungicide Resistance Management

- Critical to an effective and sustainable fungicide spray program
- Accurately diagnose the problem
- Know the mode of action of the fungicide
  - FRAC number or group number



## Fungicide Resistance Management Strategies

- Never use one mode of action alone in a full season program
  - Alternate with fungicides with a different mode of action
  - Use the "2-spray" rule (unless label indicates otherwise)
- Stay within the recommended rate range
- Apply at the correct growth stage



# Preventing the Spread of Viroids

- Plant clean stock material
- Good sanitation practices (propagation and field)
- Early detection and rapid response (remove HSVd plants)



# **Sanitation Practices**

- Handle healthy plants first
- Wear clean clothing
- Use clean tools (free of dirt, sap and plant debris)
  - Use soap and water and scrub brush
- Remove pruning material from the yard immediately
- Use sanitizers





# **Equipment Sanitation**

- Tools <u>must be</u> free of dirt and plant debris
- Do all healthy (asymptomatic) plants first
- Sanitize between plants
  - Lysol
  - 10% chlorox
  - 20% skim milk
  - KleenGrow
  - Virkon S
  - GreenShield



#### Preventing Pathogen Spread Through Farm Stewardship



#### FRUIT PATHOLOGY LAB



#### Supporting Healthy Safe Fruit Production

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