Identifying and Managing Diseases of Hops

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Hops Scouting Basics

• Visited 30 farms on a bi-weekly basis from early-June to mid-August

•Covered all major regions of Central New York’s traditional hops growing area:
  • Finger Lakes
  • Mohawk Valley
  • Albany/mid-Hudson
  • Leatherstocking Region/Susquehanna River

• Includes growing zones 4-6 and a wide variety of soil types and prior farm uses.
Scouting area:
Rochester to Albany (~15000 sq miles)
Disease and Pest Scouting Protocol

• Randomly selected ~10% of each hop yard’s plants to scout

• Looked on both sides of 3 leaves/plant for signs of pests

• Results were tallied as the proportion of plants/yard with incidence of a given pest

• Made yard-wide observations of disease symptoms

• Routine and Systematic = can be adopted on every farm
Disease and Pest Scouting Protocol
Diseases of NY Hops Yards:

Primarily Fungal
Downy mildew

• Specific to hops: *Pseudoperonospora humuli*
• History: Japan and Wisconsin ~1905
• New York in 1920s (maybe earlier)
• Oregon, Washington’s Yakima Valley, California by late 1920s

• In New York: “Blight” of 1900s is still present
  • Pressure all season long
    • Across the state
Downy Mildew Basics

• Overwinters in crown

• First appears as basal “spikes”

• Dew, fog, rain, **sprinklers** spread spores:
  • 3-6 hour wet @ 45-60 deg
  • 1.5-2 hour wet @ 65-95 deg
Healthy Shoots
Prevention and Treatment Downy Mildew

• Site for air flow

• Buy Certified Clean Plants

• Avoid excessive fertility

• Prune spikes, prune basal leaves, remove debris

• Have a fungal spray program sketched out (~6 sprays)
Variety Selection for DM management

- Cascade, Liberty, Willamette (Aroma): Tolerant
- Centennial, Chinook, Brewers Gold (Bittering): Tolerant
- Fuggle, Perle (Aroma): Resistant
- Newport, Magnum (Bittering): Resistant

- Tolerant: Still require ~3 sprays/season
Downy Mildew Fungicides

1. Copper i.e., Captan, Badge SC

2. Strobilurin i.e., Pristine, Flint

3. Phosphites i.e., Rampart, Fosphite

4. Biological Fungicides, OMRI-approved: Actinovate, Regalia
Powdery Mildew

• Still basically non-existent in NY
Botrytis and Alternaria:  
Late season diseases resulting from wet weather during burr/cone formation: **Flowering to Harvest**
Botrytis and Alternaria:

• Made worse by wind damage followed by wetting events

• Well-timed fungicide application:
  • Phosphites 2 weeks prior to harvest
Fusarium (Cone Tip Blight)

- Late season
- Highest incidence in Nugget, Willamette
- Wind, hail, thunderstorms, high humidity and heat
- Poorly understood
Fungal Disease Summary

1. **Downy Mildew**: All season control

2. **Botrytis and Alternaria**: Flowering to Harvest

3. **Fusarium Cone Tip Blight**: Monitor, but no real control methods
Prevention of Fungal Diseases

- Proper cultural techniques: pruning, air flow, remove basal leaves
- Proper **nutrition**, irrigation, fertility
- SPRAY PROGRAM
Get Pesticide Applicator License
Hops Also Susceptible to **Viral Diseases**

- Hop Stunt Virus
  - Lose ~1/3 vigor and yield

- Apple Mosaic Virus
Apple mosaic virus

- Can reduce cone wt. by 50%
- Can reduce AA content by 10%
- May be symptomless
- Spreads by plant to plant contact, infected sap, and root grafts
- Use virus-indexed plants

Photos: Compendium of Hop Diseases and Pests
Prevention:

Hops Clean Plant Network

- Hop source material is tested initially for:
  - American hop latent virus*
  - Apple fruit crinkle viroid (not known to occur in North America)
  - Apple mosaic virus * (a.k.a. Prunus necrotic ringspot virus hop isolate)
  - Arabis mosaic virus
  - Hop latent viroid
  - Hop latent virus *
  - Hop mosaic virus *
  - Hop stunt viroid*
  - Strawberry latent ringspot virus
  - Phytoplasma
  - Grown in meristem culture, tested 3x more times for *viruses
Goals for 2015 Scouting Season:

1. **Better Diagnostics:** partnering with Geneva Experimental Station

2. **Plant Sap Tests for Nutritional Analysis:** Dr. Michael Rutzke of Cornell Soil and Crop Sciences

3. **Ultimate Goal:** Weather-based recommendations for spray programs