

## Outagamie County Seminar

### Fruit and Vegetable Diseases to Watch for in 2016

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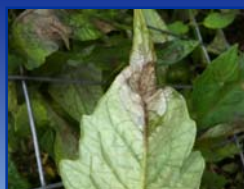
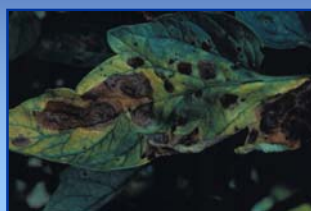
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## Fruit and Vegetable Diseases Tomato Leaf Blights

- **Causes**
  - *Septoria lycopersici* (Septoria leaf spot)
  - *Alternaria solani* (early blight)
  - *Phytophthora infestans* (late blight)
- **Hosts**
  - Tomato
  - Potato (early blight, late blight)
- **Favorable environment: Cool, wet weather**



## Fruit and Vegetable Diseases Tomato Leaf Blights

- **Control (early blight, Septoria leaf spot)**
  - Remove and destroy infested debris
  - Move tomatoes to new location (?)
  - Plant resistant varieties (?)
  - Space plants far apart
  - Mulch around the base of plants
  - DO NOT over-mulch

## Fruit and Vegetable Diseases Tomato Leaf Blights

- **Control (early blight, Septoria leaf spot)**
  - DO NOT overhead water
  - Remove infected leaf tissue (?)
  - Use fungicides to prevent infections
    - Chlorothalonil, copper, neem oil
    - Alternate active ingredients (FRAC codes)
    - Apply at 7-14 days intervals

## Fruit and Vegetable Diseases Tomato Leaf Blights

- **Control (late blight)**
  - Remove and destroy
    - Infected plants, fruits, tubers
    - Volunteer tomato and potato plants
    - Weed hosts
  - **DO NOT** use last year's potatoes as seed potatoes
  - **DO** use certified seed potatoes

## Fruit and Vegetable Diseases Tomato Leaf Blights

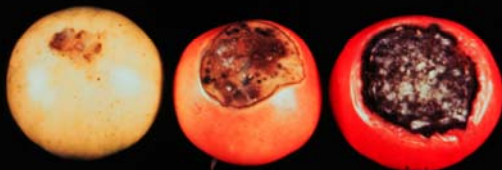
- **Control (late blight)**
  - Grow resistant tomato varieties
    - **Excellent:** 'Black Plum', 'Defiant', 'Iron Lady', 'Matt's Wild Cherry', 'Mountain Magic', 'Mountain Merit', 'Plum Regal', 'Yellow Currant', 'Yellow Pear'
    - **Good:** 'Aunt Ginny's Purple', 'Big Rainbow', 'Red Currant', 'Tigerella'
    - **Moderate:** 'Aunt Ruby's German Green', 'Black Krim', 'Juliet', 'Pruden's Purple', 'Red Pearl', 'Slava', 'Stupice', 'Sun Sugar', 'Wapsipinicon', 'Wisconsin 55'

## Fruit and Vegetable Diseases Tomato Leaf Blights

- **Control (late blight)**
  - Use fungicides to prevent infections
    - Chlorothalonil, copper
    - Apply at 7-14 day intervals

## Fruit and Vegetable Diseases Blossom End Rot

- **Cause:** Calcium deficiency
- **Hosts**
  - Tomato
  - Pepper
  - Eggplant
  - Cucurbits (cucumber, squash, pumpkin)
- **Favorable environment:** Drought



## Fruit and Vegetable Diseases Blossom End Rot

- **Management**
  - Test soil to determine calcium level
  - Add calcium as needed
    - Bone meal
    - Egg shells
  - Water plants adequately

## Fruit and Vegetable Diseases Powdery Mildew

- **Causes**
  - *Sphaerotheca fuliginea*
  - *Erysiphe cichoracearum*
  - *Oidium* spp.
- **Hosts**
  - Cucurbits (cucumber, squash pumpkin)
  - Other vegetables (and fruits)
- **Favorable environment: High humidity**



## Fruit and Vegetable Diseases Powdery Mildew

- **Control**
  - Plant resistant varieties
  - DO NOT crowd plants
  - Thin vines
  - Apply fungicides for control
    - Elemental sulfur
    - 1.5 Tbsp baking soda + 3 Tbsp light-weight horticultural oil in 1 gal water
    - Apply at 7-14 day intervals

## Fruit and Vegetable Diseases Aster Yellows

- **Cause: Aster yellows phytoplasma**
- **Hosts**
  - Carrot
  - Potato
  - Other vegetables
- **Favorable environment**
  - None in terms of weather
  - High aster leafhopper populations



## Fruit and Vegetable Diseases Aster Yellows

- **Control**
  - Remove infected plants
  - Control leafhoppers (?)

## Fruit and Vegetable Diseases Herbicide Injury

- **Causes**
  - Growth regulator herbicides
    - 2,4-D
    - Dicamba
  - Other classes of herbicides
- **Affected plants**
  - All vegetables, particularly tomato
- **Favorable Environment: High wind**



## Fruit and Vegetable Diseases Herbicide Injury

- **Management**
  - DO NOT use herbicides
  - If you or your neighbors do use herbicides, make sure that you or they
    - Follow application directions exactly
    - Apply herbicides at low wind speeds (< 5 mph)
    - DO NOT apply herbicides too close to sensitive plants
    - Apply herbicides at low pressure
    - Use amine rather than ester forms of herbicides

## Fruit and Vegetable Diseases Common Smut

- **Cause:** *Ustilago maydis*
- **Host:** Corn
- **Favorable environment:** Hail

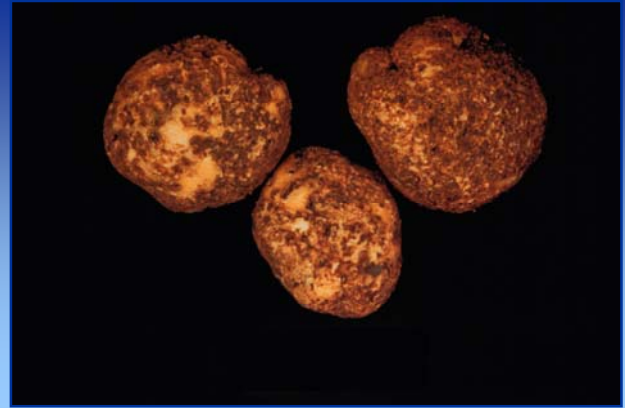


## Fruit and Vegetable Diseases Common Smut

- **Control**
  - Plant resistant varieties
  - Reduce physical damage to corn plants
  - Give up on your corn and eat the smut

### Fruit and Vegetable Diseases Scab

- Cause: Streptomyces scabies
- Host
  - Potato
  - Other root crops (carrot, radish, turnip)
- Favorable environment: High soil pH

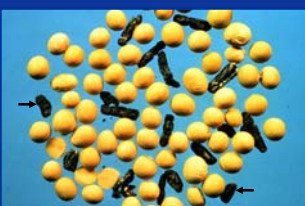


### Fruit and Vegetable Diseases Scab

- Control
  - Plant scab-free potato stock
  - Routinely rotate crops to avoid build-up of the pathogen
    - Avoid planting potatoes in infested areas
    - Plant non-hosts in infested areas
  - Move potatoes to another location
  - Plant scab resistant varieties
  - Lower soil pH

### Fruit and Vegetable Diseases White Mold

- Cause: Sclerotinia sclerotiorum
- Host
  - Snap beans
  - Other vegetables
  - Sunflower
- Favorable environment: Cool, wet weather



### Fruit and Vegetable Diseases White Mold

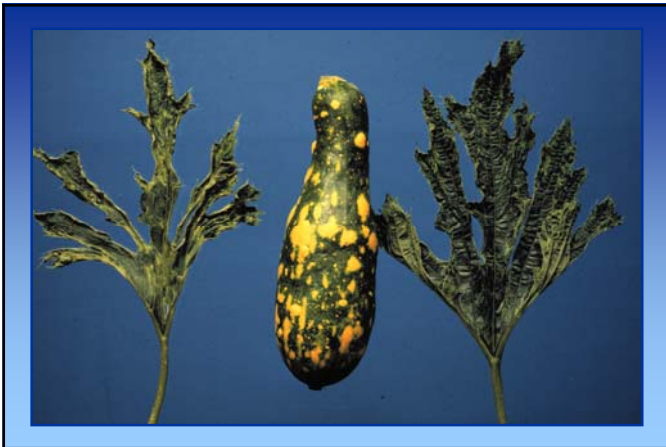
- Control
  - Buy high quality seed
  - Routinely rotate crops to avoid build-up of the pathogens
    - Avoid planting susceptible vegetables in infested areas (5-7 yrs)
    - Plant non-hosts in infested areas
  - Control broad-leaf weeds
  - Plant beans with wider row spacings

## Fruit and Vegetable Diseases White Mold

- **Control**
  - DO NOT over-water
  - DO NOT over-mulch
  - DO NOT over-fertilize
  - Remove symptomatic plants immediately
  - Use biological control products
    - Coniothyrium minitans
    - Parasitizes sclerotia

## Fruit and Vegetable Diseases Cucumber Mosaic

- **Cause:** *Cucumber mosaic virus*
- **Hosts**
  - Cucurbits
  - Pepper
  - Tomato
- **Favorable environment**
  - None in terms of weather
  - High aphid populations



## Fruit and Vegetable Diseases Cucumber Mosaic

- **Control**
  - Plant resistant/tolerant varieties
    - Plant based resistance
    - Plant based tolerance
    - Genetically modified plants
  - Attempt to control aphid vectors (?)
  - Attempt to eliminate alternate hosts (?)

## Fruit and Vegetable Diseases Scab (Apple and Pear)

- **Cause:** *Venturia inaequalis* (*V. pirina*)
- **Hosts**
  - Apple
  - Crabapple
  - Pear
  - Mountain ash
- **Favorable environment:** Cool, wet weather



## Fruit and Vegetable Diseases Scab (Apple and Pear)

- **Control**
  - Plant resistant varieties
  - Remove and destroy diseased leaves
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - Thin trees to promote air flow

## Fruit and Vegetable Diseases Scab (Apple and Pear)

- **Control**
  - Use fungicides to prevent infections
    - Chlorothalonil, copper, mancozeb, myclobutanil, propiconazole, thiophanate-methyl, sulfur
    - Alternate active ingredients (FRAC codes)
    - From bud break through the end of favorable weather
    - Apply at 7-14 day intervals

## Fruit and Vegetable Diseases “Cedar-Apple” Rusts

- **Cause:** *Gymnosporangium* spp.
- **Hosts**
  - Junipers
  - Woody rosaceous plants (apple, crabapple, hawthorn, quince, pear!)
- **Favorable environment:** Wet weather



## Fruit and Vegetable Diseases “Cedar-Apple” Rusts

- **Control**
  - Grow only the juniper or rosaceous host
  - Use resistant cultivars/varieties
  - Remove galls

## Fruit and Vegetable Diseases “Cedar-Apple” Rusts

- **Control**
  - Use fungicides to prevent infections
    - Ferbam, triadimefon
    - Alternate active ingredients (FRAC codes)
    - Mid May through mid June (rosaceous hosts)
    - Early July through August (juniper hosts)
    - Apply at 7-21 day intervals

### Fruit and Vegetable Diseases **Black Knot**

- Cause: Apiosporina morbosa
- Hosts
  - Prunus species
  - Plums
  - Cherries
- Favorable environment: Wet weather



### Fruit and Vegetable Diseases **Black Knot**

- Control
  - DO NOT plant infected Prunus stock
  - Buy black knot-resistant varieties if available (Prunus 'Accolade', Prunus sargentii, Prunus maackii)
  - Remove volunteer plums/cherries
  - Prune diseased branches
  - DO NOT use fungicides

### Fruit and Vegetable Diseases **Fire Blight**

- Cause: Erwinia amylovora
- Hosts
  - Many rosaceous plants
  - Apple, crabapple, pear, mountain ash, cotoneaster
- Favorable environment
  - Wet weather
  - Hail



### Fruit and Vegetable Diseases **Fire Blight**

- Control
  - Plant resistant varieties where available
  - Prune diseased branches
  - Do not over-fertilize with nitrogen
  - Use bactericides to prevent infections (?)
    - Copper-containing fungicides, antibiotics
    - During flowering
    - Applications every 7-14 days (3-4 days)



## Fruit and Vegetable Diseases Brown Rot

- **Causes**
  - *Monilinia fructicola*
  - *Monilinia laxa*
  - *Monilinia fructigena*
- **Hosts**
  - Stone fruits (apricot, cherry, peach, plum)
  - Apple
- **Environmental trigger: Wet weather**



## Fruit and Vegetable Diseases Brown Rot

- **Control**
  - Remove mummified fruits
  - Prune out diseased/dead branches
  - Remove volunteer stone fruit trees/shrubs
  - Dispose of contaminated plant materials
    - Burning
    - Burying
  - Prune healthy branches to increase air flow

## Fruit and Vegetable Diseases Brown Rot

- **Control**
  - Decontaminate pruning tools
    - 10% bleach
    - 70% alcohol
  - DO NOT overhead water
  - Carefully handle fruits at harvest

## Fruit and Vegetable Diseases Brown Rot

- **Control**
  - Use fungicides to prevent infections
    - Captan, myclobutanil, propiconazole
    - Apply at 10% flower (flower infections)
    - Apply 3 weeks prior to harvest (fruit infections)
    - Alternate active ingredients (FRAC codes)
  - Manage insects that injure fruit

## Fruit and Vegetable Diseases Peach Leaf Curl/Plum Pockets

- **Causes**
  - *Taphrina deformans*
  - *Taphrina communis*
- **Hosts**
  - Peach (peach leaf curl)
  - Plum (plum pockets)
- **Environmental trigger: Wet weather**



**Fruit and Vegetable Diseases**  
**Peach Leaf Curl/Plum Pockets**

- **Control**
  - Remove/destroy symptomatic leaves/fruits
    - Burn
    - Bury
    - Hot compost
  - Prune/thin trees to improve air flow
  - Use fungicides to prevent infections
    - Chlorothalonil, copper, ferbam
    - Apply after leaf fall and/or before leaf emergence

**Fruit and Vegetable Diseases**  
**Root/Crown Rots**

- **Pathogens**
  - Pythium spp.
  - Phytophthora spp.
  - Rhizoctonia solani
  - Fusarium spp.
  - Cylindrocarpon spp.
  - Thielaviopsis spp.

**Fruit and Vegetable Diseases**  
**Root/Crown Rots**

- **Hosts**
  - Any fruit crop
  - Strawberry
  - Raspberry
  - Apple
- **Favorable environment**
  - High soil moisture
  - Cool soil temperatures



**Fruit and Vegetable Diseases**  
**Root/Crown Rots**

- **Control**
  - Moderate soil moisture
    - Grow plants in well-drained sites
    - Use a soil with adequate drainage
    - Improve drainage in poorly drained soils
      - Add organic matter to improve drainage
      - Use raised beds
  - DO NOT overwater
  - DO NOT overmulch

## Fruit and Vegetable Diseases Root/Crown Rots

- **Control:**
  - DO NOT move contaminated soil or plants to non-infested areas
  - Decontaminate infested tools, pots, work areas
  - Pretest soils/mulches/composts for the presence of root rot fungi

## Fruit and Vegetable Diseases Root/Crown Rots

- **Control**
  - Use fungicides to prevent infections
    - Etridiazole, metalaxyl, mefenoxam, fosetyl-AI, (PCNB, thiophanate-methyl, fludioxonil)
    - Use granular formulations if possible
    - Use during periods of wet weather

## Fruit and Vegetable Diseases White Pine Blister Rust

- **Pathogen:** *Cronartium ribicola*
- **Hosts**
  - Gooseberry/Currants (*Ribes* spp.)
  - White pine
- **Favorable environment:** Wet weather



## Fruit and Vegetable Diseases White Pine Blister Rust

- **Control**
  - DO NOT plant gooseberries/currants near white pines
  - Plant pines other than white pine
  - DO NOT overcrowd white pines
  - Keep weeds under control
  - DO NOT overhead irrigate
  - Scout routinely for disease

## Fruit and Vegetable Diseases White Pine Blister Rust

- **Control**
  - Prune diseased branches
  - Prune healthy branches from the ground up
  - Disinfest pruning tools
    - 70% alcohol
    - 10% bleach
    - Commercial disinfectants
  - DO NOT use fungicides

***Fruit and Vegetable Diseases  
Where to Go for Help***

***Plant Disease Diagnostics Clinic  
Department of Plant Pathology  
University of Wisconsin-Madison  
1630 Linden Drive  
Madison, WI 53706-1598  
(608) 262-2863  
pddc@plantpath.wisc.edu  
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