Organic Gardening Short Course 2014

Diseases of Vegetables

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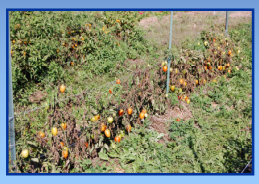
Diseases of Vegetables
Tomato Leaf Blights

- *Causes*
  - *Alternaria solani (early blight)*
  - *Septoria lycopersici (Septoria leaf spot)*
  - *Phytophthora infestans (late blight)*
- *Hosts*
  - *Tomato*
  - *Potato (early blight, late blight)*
- *Environmental trigger: Wet weather*



Diseases of Vegetables
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*

Diseases of Vegetables
Tomato Leaf Blights

- *Control (early blight, Septoria leaf spot)*
  - *DO NOT overhead water*
  - *Thin plants/remove healthy leaves*
  - *Remove diseased leaves*
  - *Use fungicides to prevent infections*
    - *Copper, neem oil*
    - *Applications every 7-14 days*

Diseases of Vegetables
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

Diseases of Vegetables
Tomato Leaf Blights

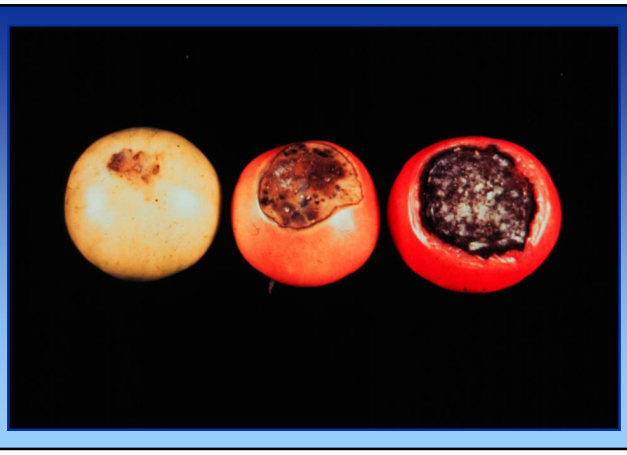
- Control (late blight)
  - Grow resistant tomato varieties
    - 'Better Boy', 'Golden Sweet', 'Green Zebra', 'Juliet', 'Legend', 'Magic Mountain', 'Matt's Wild Cherry', 'Pruden's Purple', 'Regal Plum', 'Roma', 'Slava', 'Stupice', 'Sun Sugar', 'Wapsipinicon', 'Wisconsin 55'

Diseases of Vegetables
Tomato Leaf Blights

- Control (late blight)
  - Use fungicides to prevent infections
    - Copper
    - Applications every 7-14 days

Diseases of Vegetables
Blossom End Rot

- Cause: Calcium deficiency
- Affected plants
  - Tomato
  - Pepper
  - Eggplant
  - Cucurbits (cucumber, squash, pumpkin)
- Environmental trigger: Drought



Diseases of Vegetables
Blossom End Rot

- Management
  - Test soil to determine calcium level
  - Add calcium as needed
    - Bone meal
    - Egg shells
    - NOT lime (usually)
  - Water plants adequately and uniformly

Diseases of Vegetables
Powdery Mildew

- Causes
  - *Sphaerotheca fuliginea*
  - *Erysiphe cichorecearum*
  - *Oidium* spp.
- Hosts: Cucurbits (cucumber, squash, pumpkin)
- Environmental trigger: High humidity

Diseases of Vegetables
Powdery Mildew

- Control
  - Plant resistant varieties
  - DO NOT crowd plants
  - Thin vines
  - Grow plants on a trellis

Diseases of Vegetables
Powdery Mildew

- Control
  - Apply fungicides for control
    - Sulfur, neem oil, other plant-based oils
    - 1.5 Tbsp baking soda + 3 Tbsp light-weight horticultural oil in 1 gal water
    - Apply when humidity is >60-70%
    - Apply every 7-14 days

Diseases of Vegetables
Aster Yellows

- Cause: Aster yellows phytoplasma
- Hosts
  - Carrot
  - Potato
- Environmental trigger: None
- Transmission: Aster leafhopper

Diseases of Vegetables
Aster Yellows

- Control
  - Remove infected plants
  - Use insecticides to control leafhoppers (?)

Diseases of Vegetables
Common Smut

- Cause: Ustilago maydis
- Host: Corn
- Environmental trigger: Hail

Diseases of Vegetables
Common Smut

- Control
  - Plant resistant varieties
  - Reduce physical damage to corn plants
  - DO NOT use chemical or biological controls
  - Give up on your corn and eat the smut

Diseases of Vegetables
Herbicide Injury

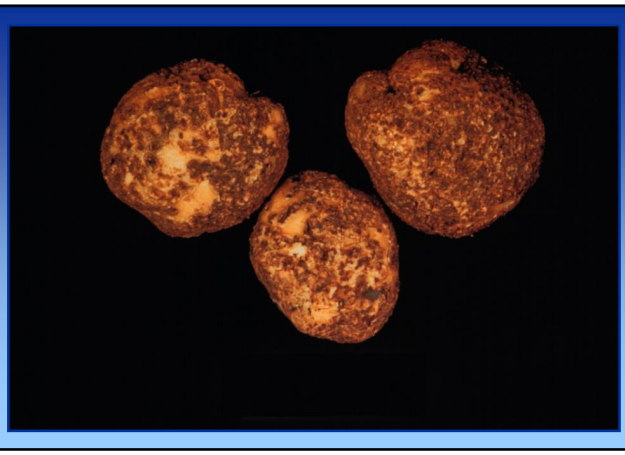
- Causes
  - Growth regulator herbicides
    - 2,4-D
    - Dicamba
  - Other herbicides
- Affected plants
  - All vegetables
  - Tomatoes

Diseases of Vegetables
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

Diseases of Vegetables
Common Scab

- Cause: *Streptomyces scabies*
- Hosts
  - Potato
  - Carrot
  - Other root crops
- Environmental trigger: High soil pH



Diseases of Vegetables
Common Scab

- Control
  - Plant scab-free potato stock
  - Routinely rotate crops
    - DO NOT grow host plants in an infested areas
    - Plant non-hosts in infested areas
  - Move potatoes to another location
  - Plant scab resistant varieties
  - Lower soil pH
  - DO NOT use chemical or biological controls

Diseases of Vegetables
Vascular Wilts

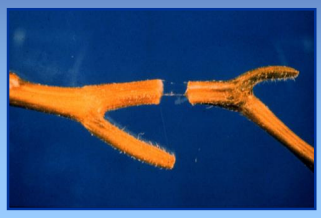
- Hosts
  - Solanaceous vegetables (tomato, potato, pepper, eggplant)
  - Cucurbits (pumpkin, squash, cucumber)
- Causes
  - *Verticillium* spp. (Verticillium wilt)
  - *Fusarium oxysporum* (Fusarium wilt)
- Environmental trigger: Wet weather

Diseases of Vegetables
Vascular Wilts

- Control
  - Rotate crops to avoid pathogen build-up
    - DO NOT plant susceptible vegetables in infested areas
    - Plant non-hosts in infested areas
  - Plant resistant varieties (VFF)
  - DO NOT over-water
  - DO NOT over-mulch

Diseases of Vegetables
Bacterial Wilt

- Cause: Erwinia tracheiphila
- Hosts: Cucurbits (cucumber, squash, pumpkin)
- Environmental trigger: None
- Transmission: Cucumber beetles



Diseases of Vegetables
Bacterial Wilt

- Control
  - Use floating row covers
  - Remove infected plants
  - If you decide to keep infected plants, water them adequately

Diseases of Vegetables
Cucumber Mosaic

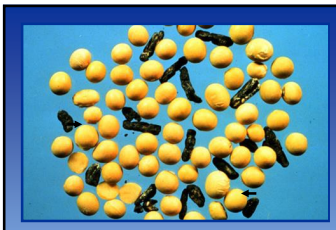
- Cause: Cucumber mosaic virus
- Hosts
  - Cucurbits
  - Pepper
  - Tomato
  - Other vegetables
- Environmental trigger: None
- Transmission: Aphids

Diseases of Vegetables
Cucumber Mosaic

- Control
  - Plant resistant/tolerant varieties
    - Plant based resistance
    - Plant based tolerance
    - Genetically modified plants
  - Eliminate weed hosts
  - Attempt to control aphid vectors (?)
  - DO NOT use chemical or biological controls

Diseases of Vegetables
White Mold

- Cause: *Sclerotinia sclerotiorum*
- Hosts
  - Snap beans
  - Carrots
  - Many other vegetables
- Environmental trigger: Cool, humid weather



Diseases of Vegetables
White Mold

- Control
  - Buy high quality vegetable seed
  - Prevent introduction through other seed
  - Routinely rotate crops
    - Avoid planting susceptible vegetables in infested areas (5-7 yrs)
    - Plant non-hosts in infested areas
  - Plant beans with wider row spacings

Diseases of Vegetables
White Mold

- Control
  - DO NOT over-water
  - DO NOT over-mulch
  - DO NOT over-fertilize
  - Control broad-leaf weeds
  - Use biological control products
    - *Coniothyrium minitans*
    - Parasitizes sclerotia

Diseases of Vegetables
Root Rots

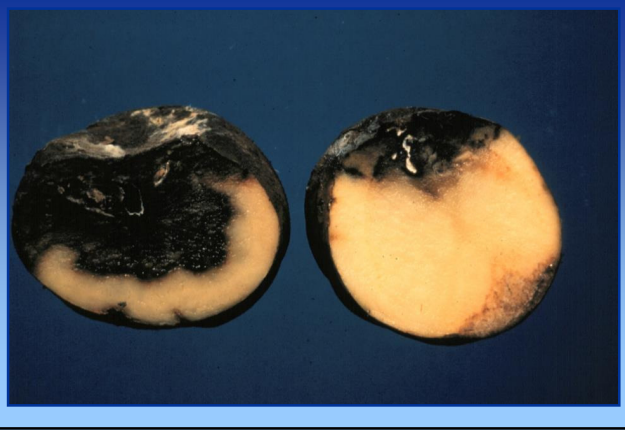
- Causes
  - *Pythium* spp. (Pythium root rot)
  - *Rhizoctonia solani* (Rhizoctonia root rot)
- Hosts
  - Snap beans
  - Other vegetables
- Environmental trigger: Wet, cool soils

Diseases of Vegetables
Root Rots

- Control
  - Routinely rotate crops
  - DO NOT over-water
  - DO NOT over-mulch

Diseases of Vegetables
Bacterial Soft Rot

- Cause: Pectobacterium carotovorum
- Hosts
  - Potato
  - Carrot
  - Most other vegetables
- Environmental triggers
  - Wet soils
  - Wet storage conditions



Diseases of Vegetables
Bacterial Soft Rot

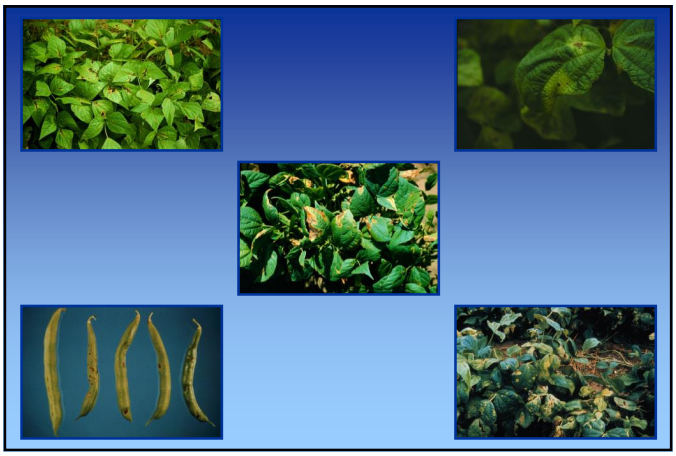
- Control
  - Moderate soil moisture
  - Have good soil fertility (particularly calcium)
  - Harvest tubers promptly
  - DO NOT bruise/injure tubers
  - Keep harvested tubers dry
  - Remove any rotted tubers immediately

Diseases of Vegetables
Bean Leaf Diseases

- Causes
  - Pseudomonas syrinage pv. syringae (bacterial brown spot)
  - Pseudomonas syringae pv. phaseolicola (halo blight)
  - Xanthomonas campestris pv. phaseoli (common blight)

Diseases of Vegetables
Bean Leaf Diseases

- Hosts
  - Snap bean
  - Kidney bean
  - Lima bean
- Environmental trigger: Driving rain (?)



Diseases of Vegetables
Bean Leaf Diseases

- Control
  - Purchase high quality seed
  - Use resistant varieties where available
  - DO NOT overhead water
  - Apply bactericides (copper) for control (?)

Diseases of Vegetables
Common Rust

- Cause: *Puccinia sorghi*
- Host: Corn
- Environmental triggers
  - Moderate temperatures
  - Long periods of leaf wetness

Diseases of Vegetables
Common Rust

- Control
  - Plant resistant varieties

Diseases of Vegetables
Damping-Off/Seedling Blights

- Pathogens
  - *Pythium* spp.
  - *Rhizoctonia solani*
  - *Fusarium* spp.
- Hosts: Any vegetable seedling
- Environmental trigger: Cool, wet soils

Diseases of Vegetables
Damping-Off/Seedling Blights

- Control
  - Use a pasteurized soil mixture
  - Use decontaminated pots, working surfaces and tools
    - 10% bleach
    - 70% alcohol
    - Commercial disinfectants

Diseases of Vegetables
Damping-Off/Seedling Blights

- Control
  - Moderate soil moisture
    - Use a soil with adequate drainage
    - DO NOT over-water
  - Germinate seeds at higher temperatures

Diseases of Vegetables
Damping-Off/Seedling Blights

- Control
  - Use biological control products to protect seedlings
    - *Streptomyces lydicus*, *Trichoderma* spp., *Gliocladium* spp., *Pseudomonas* spp., *Bacillus* spp.
    - Applied as a seed treatment or soil treatment

Diseases of Vegetables
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
http://pddc.wisc.edu
Follow the clinic on Twitter @UWPDDC