Green Thumb Gardening

Vegetable Diseases

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Vegetable Diseases
Fungal 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

Vegetable Diseases
Fungal Leaf Blights

- Control (early blight, Septoria leaf spot)
  - Remove and destroy contaminated debris
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - Move tomatoes to new location

Vegetable Diseases
Fungal Leaf Blights

- Control (early blight, Septoria leaf spot)
  - Plant resistant varieties
  - Space plants far apart
  - Mulch around the base of plants
  - DO NOT overmulch

Vegetable Diseases
Fungal Leaf Blights

- Control (early blight, Septoria leaf spot)
  - DO NOT overhead water
  - Thin plants as they grow
  - Use fungicides to prevent infections
    - Chlorothalonil, mancozeb
    - Copper
    - Alternate active ingredients (FRAC codes)
    - Apply at 7-14 days intervals

Vegetable Diseases
Fungal Leaf Blights

- Control (late blight)
  - Remove any infected plants and plant parts
    - Infected tomato/potato plants including fruits and tubers
    - Volunteer tomato and potato plants
    - Weed hosts
  - Destroy any infected plants and plant parts
    - Burn (where allowed)
    - Double bag and landfill

Vegetable Diseases
Fungal Leaf Blights

- Control (late blight)
  - DO NOT use last year's potatoes as seed
  - DO use certified seed potatoes
  - Grow resistant tomato varieties
    - "Late Blight Management in Tomato with Resistant Varieties" (https://eorganic.org/node/10822)

Vegetable Diseases
Fungal Leaf Blights

- Control (late blight)
  - Use fungicides to prevent infections
    - Chlorothalonil, mancozeb
    - Copper
    - Alternate active ingredients (FRAC codes)
    - Start applications based on Blitecast (https://wisconsinpotatoes.com/blog-news/)
    - Apply at 7-14 day intervals

Vegetable Diseases
Blossom End Rot

- Cause: Calcium deficiency
- Affected plants
  - Tomato
  - Pepper
  - Eggplant
  - Cucurbits (cucumber, squash, pumpkin, watermelon)
- Favorable Environment: Drought

Vegetable Diseases
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

Vegetable Diseases
Powdery Mildew

- Causes
  - Miscellaneous powdery mildew fungi
  - *Oidium* spp.
- Hosts
  - Cucurbits (cucumber, squash, pumpkin)
  - Other vegetables (pea, tomato)
- Favorable environment: High humidity

Vegetable Diseases
Powdery Mildew

- Control
  - Remove and destroy plant debris
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - Reduce humidity
    - Plant less densely/thin existing stands
    - Grow vining plants on a trellis
  - Use resistant cultivars/varieties

Vegetable Diseases
Powdery Mildew

- Control
  - Use fungicides to prevent infections
    - Dithiocarbamates, myclobutanil, propiconazole, tebuconazole, thiophanate-methyl
    - Sulfur, neem oil, other plant-based oils
    - 1.5 Tbsp baking soda + 3 Tbsp light-weight horticultural oil in 1 gal water
    - Alternate active ingredients (FRAC codes)
    - Apply when humidity is >60-70%
    - Apply every 7-14 days

Vegetable Diseases
Walnut Toxicity

- Cause: Juglones
  - Black walnut
  - Butternut
  - Hickory
- Affected plants
  - Many vegetables
  - Tomato, potato, pepper, eggplant
  - Asparagus, cabbage



Vegetable Diseases
Walnut Toxicity

- Management
  - DO NOT plant sensitive vegetables near walnut trees
  - Plant tolerant vegetables
    - Beans
    - Beet
    - Carrot
    - Corn
    - Melon
    - Onion
    - Parsnip
    - Squash
  - Plant sensitive vegetables
    - in raised beds
    - in pots

Vegetable Diseases
Walnut Toxicity

- Management
  - Keep walnut leaves and fruits out of your garden
  - DO NOT compost walnut leaves and fruits
  - Remove volunteer walnut trees
  - Remove mature walnut trees (?)

Vegetable Diseases
Herbicide Injury

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




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

Vegetable Diseases
Common Smut

- Cause: *Ustilago maydis*
- Host: Sweet corn
- Favorable environment
  - None (ear infections)
  - Hail (leaf and stalk infections)

Vegetable Diseases
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 (huitlacoche)

Vegetable Diseases
Black Rot

- Cause: *Xanthomonas campestris* pv. *campestris*
- Hosts: Crucifers
  - Brussels sprouts, cabbage, collards
  - Broccoli, cauliflower, kale, kohlrabi, rutabaga, turnips
- Favorable environment: Wet weather

Vegetable Diseases
Black Rot

- Control
  - Buy high quality (certified pathogen-free) seed or transplants
  - Heat treat seeds
    - 35 min, 122°F (Brussels sprouts, cabbage, collards)
    - 20 min, 122°F (broccoli, cauliflower, kale, kohlrabi, rutabaga, turnips)

Vegetable Diseases
Black Rot

- Control
  - Routinely rotate crops
    - DO NOT grow host plants in an infested areas
    - Plant non-hosts in infested areas
  - Fertilize properly (particularly nitrogen)
  - DO NOT overhead water
  - DO NOT handle plants when wet

Vegetable Diseases
Black Rot

- Control
  - Remove and dispose of contaminated plants
    - Burn (where allowed)
    - Deep bury
    - Hot compost
  - Decontaminate infested items (70% alcohol, disinfectants, 10% bleach)

Vegetable Diseases
Black Rot

- Control
  - Use bactericides to prevent infections
    - Copper
    - Apply at 7-14 days intervals
    - Tolerant bacterial strains are a problem

Vegetable Diseases
Common Scab

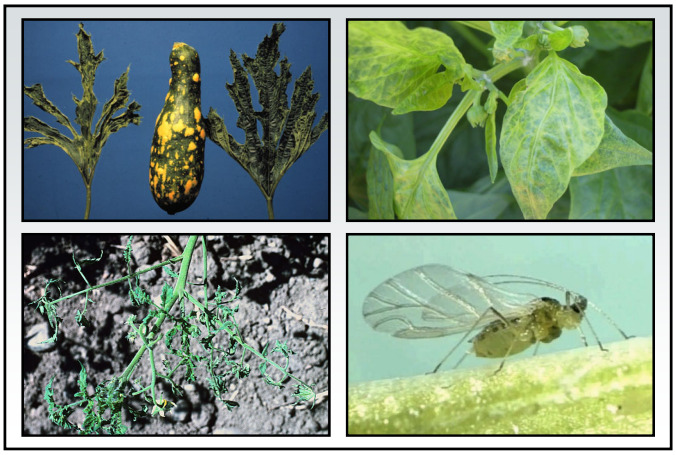
- Cause: *Streptomyces scabies*
- Hosts
  - Potato
  - Carrot
  - Other root crops
- Favorable environment: High soil pH

Vegetable Diseases
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

Vegetable Diseases
Cucumber Mosaic

- Cause: *Cucumber mosaic virus* (CMV)
- Hosts
  - Cucurbits
  - Pepper
  - Tomato
  - Other vegetables
- Favorable environment: None
- Transmission: Aphids



Vegetable Diseases
Cucumber Mosaic

- Control
  - Plant resistant/tolerant varieties
    - Plant based resistance
    - Plant based tolerance
    - Genetically modified plants
  - Eliminate weed hosts
  - Apply insecticides to control aphids
  - DO NOT use chemical or biological controls

Vegetable Diseases
Downy Mildew

- Causes
  - *Pseudoperonospora cubensis*
  - *Peronospora belbahrii*
- Hosts
  - Cucurbits (cucumber, squash, pumpkin)
  - Basil

Vegetable Diseases
Downy Mildew

- Favorable environment
  - High moisture
  - High humidity
  - Moderate/warm temperatures

Vegetable Diseases
Downy Mildew

- Control
  - Start with clean seed and transplants
  - Grow less susceptible/resistant varieties
    - Red varieties of basil
    - Sweet basil 'Eleonora'
    - Certain cucumber and cantaloupe varieties with lesser success for squash and pumpkin varieties

Vegetable Diseases
Downy Mildew

- Control
  - DO NOT overcrowd plants
  - DO NOT overhead water
  - Destroy diseased and asymptomatic plants
    - Burn (where allowed)
    - Double bag and landfill

Vegetable Diseases
Downy Mildew

- Control
  - Use fungicides to prevent infections (cucurbits)
    - Chlorothalonil, mancozeb, phosphorus acids
    - Copper
    - Start applications based predictive models (http://cdm.ipmpipe.org/)
    - Apply at 7-14 day application interval

Vegetable Diseases
Vascular Wilts

- Causes
  - *Verticillium* spp. (Verticillium wilt)
  - *Fusarium oxysporum* (Fusarium wilt)
- Hosts
  - Solanaceous vegetables (tomato, potato, pepper, eggplant)
  - Cucurbits (pumpkin, squash, cucumber, watermelon)

Vegetable Diseases
Vascular Wilts

- Favorable environment
  - Wet weather (for infection)
  - Dry weather (for symptom development)

Vegetable Diseases
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 overwater
  - DO NOT overmulch
  - DO NOT use fungicides or biological controls

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@wisc.edu
https://pddc.wisc.edu
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