Pierce County Seminar

**Diseases of Tomatoes and
Other Vegetables**

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NPDN
National Plant Diagnostic Network

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Diseases of Tomatoes et al.
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*
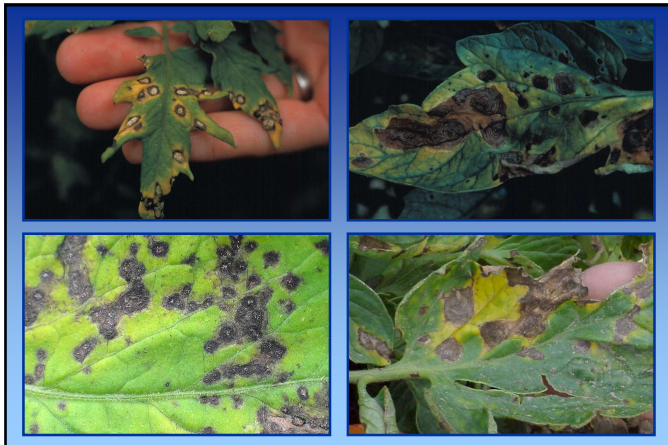
Diseases of Tomatoes et al.
Fungal Leaf Blights

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

Diseases of Tomatoes et al.
Fungal Leaf Blights

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

Diseases of Tomatoes et al.
Fungal 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 Tomatoes et al.
Fungal Leaf Blights

- *Control (late blight)*
  - *Grow resistant tomato varieties*
    - *"Late Blight Management in Tomato with Resistant Varieties"*
    http://www.extension.org/pages/72678/late-blight-management-in-tomato-with-resistant-varieties#.VVNSsPlVhBd

Diseases of Tomatoes et al.
Fungal Leaf Blights

- *Control (late blight)*
  - *Use fungicides to prevent infections*
    - *Chlorothalonil, mancozeb*
    - *Copper*
    - *Alternate active ingredients (FRAC codes)*
    - *Start applications based on Blitecast (http://www.plantpath.wisc.edu/wivegdis/)*
    - *Apply at 7-14 day intervals*

Diseases of Tomatoes et al.
Bacterial Tomato Diseases

- *Causes*
  - *Pseudomonas syringae pv. tomato (bacterial speck)*
  - *Xanthomonas spp. (bacterial spot)*
- *Host: Tomato*
- *Favorable environment*
  - *Cool, wet weather (bacterial speck)*
  - *Warm, wet weather (bacterial spot)*

Diseases of Tomatoes et al.
Bacterial Tomato Diseases

- *Control*
  - *Dispose of contaminated plant debris (burn, bury, hot compost)*
  - *Remove and destroy volunteer tomatoes*
  - *Start with pathogen-free seeds and plants*
  - *Hot water treat seeds (122°F, 25 minutes)*
  - *Move tomatoes to new location*
  - *Space plants far apart*

Diseases of Tomatoes et al.
Bacterial Tomato Diseases

- *Control*
  - *Mulch around the base of plants*
  - *DO NOT over-mulch*
  - *DO NOT overhead water*
  - *DO NOT handle plants when wet*
  - *Use bactericides to prevent infections*
    - *Copper*
    - *Apply at 7-14 days intervals*
    - *Tolerant bacterial strains are a problem*

Diseases of Tomatoes et al.
Blossom End Rot

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

Diseases of Tomatoes et al.
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 Tomatoes et al.
Vascular Wilts

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

Diseases of Tomatoes et al.
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*
  - *DO NOT use fungicides or biological controls*

Diseases of Tomatoes et al.
Walnut Toxicity

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

Diseases of Tomatoes et al.
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*

Diseases of Tomatoes et al.
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 (?)*

Diseases of Tomatoes et al.
Herbicide Injury

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

Diseases of Tomatoes et al.
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 Tomatoes et al.
Powdery Mildew

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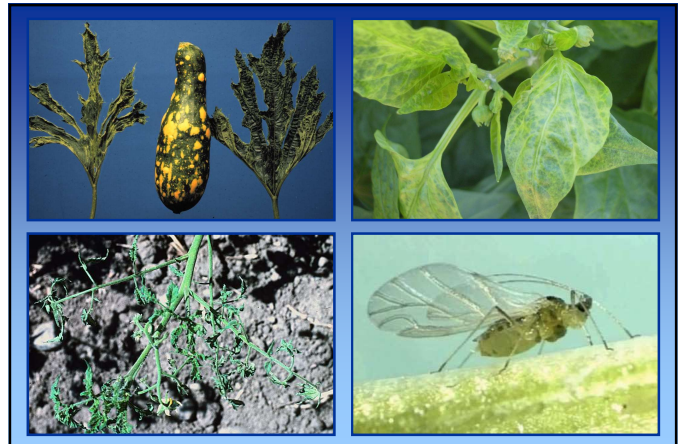

Diseases of Tomatoes et al.
Powdery Mildew

- *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*

Diseases of Tomatoes et al.
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*

Diseases of Tomatoes et al.
Cucumber Mosaic

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

Diseases of Tomatoes et al.
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 bactericides or biological controls*

Diseases of Tomatoes et al.
Aster Yellows

- *Cause: Aster yellows phytoplasma*
- *Hosts*
  - *Carrot*
  - *Potato*
  - *Other vegetables*
- *Favorable environment: None*
- *Transmission: Aster leafhopper*

Diseases of Tomatoes et al.
Aster Yellows

- *Control*
  - *Remove diseased plant material and debris*
    - *Hot compost*
    - *Bury*
    - *Burn (where allowed)*
  - *Control leafhopper vector (?)*

Diseases of Tomatoes et al.
Black Rot

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

Diseases of Tomatoes et al.
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)*

Diseases of Tomatoes et al.
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*
  - *Remove and dispose of contaminated plants (burn, bury, hot compost)*

Diseases of Tomatoes et al.
Black Rot

- *Control*
  - *Decontaminate infested items*
    - *10% bleach*
    - *70% alcohol*
    - *Commercial disinfectants*
  - *Use bactericides to prevent infections*
    - *Copper*
    - *Apply at 7-14 days intervals*
    - *Tolerant bacterial strains are a problem*

Diseases of Tomatoes et al.
Common Smut

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

Diseases of Tomatoes et al.
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)*

Diseases of Tomatoes et al.
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
http://pddc.wisc.edu
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