

# Management of Soilborne Diseases of Strawberry

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# Soilborne Pathogens

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- Most common are fungi and fungi-like organisms
- Survive in soils for long periods of time
- Difficult to control
- Severity of disease depends on:
  - Host
  - Environmental conditions
  - Cultural practices
  - Field history
  - Presence of other microbes

# Common Soilborne Diseases in Ohio

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- Black root rot
- Phytophthora root and crown rot
- Red Stele
- Anthracnose crown rot
- Verticillium wilt



Red stele



Black root rot



Verticillium wilt

*Image courtesy of OMAFRA*

# Black Root Rot

- Disease complex
  - *Pythium* spp.
  - *Fusarium* spp.
  - *Rhizoctonia* spp.
  - Root lesion nematode
- Disease is enhanced by environmental stressors
- Plants are stunted and wilted
- Roots turn black and rot from the outside in



Image courtesy of Frank J. Louws, NC State University



# Phytophthora Crown Rot

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- *Phytophthora cactorum*
- Marginal leaf necrosis
- Plant stunting and wilting
- Red necrosis in the crown
- Crowns are brittle
- Rot begins at top of crown and moves downward



*Image courtesy of Frank J. Louws, NC State University*

# Red Stele

- *Phytophthora fragariae*
- Plants are stunted with dull bluish-green leaves
- Roots rot from the tip upward
- Dark red root core (stele)



# Anthracnose Crown Rot

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- *Colletotrichum acutatum* and *C. gloeosporioides* species complex
- Flagging of young leaves
- Wilted and stunted plants
- Necrotic marbling in crown
- Generally strong root system





# Verticillium Wilt

- *Verticillium albo-atrum*, *V. dahliae*
- Outer and lower leaves droop
- Dark brown marginal necrosis
- Rapid wilt when plants are under stress



# Integrated Pest Management

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- Plant resistant varieties
- Plant top quality, healthy nursery stock
  - Certification programs (i.e. G1 stock for virus-tested material)
- Maintain a clean planting site
  - Remove alternate hosts
- Cultural practices
- Biocontrol
- Fungicides

# Pre-Plant Disease Management

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- Soil “fumigation” to kill pathogens present in the soil
  - Chemical fumigants
  - Alternative fumigants

# Chemical Fumigants

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- Restricted use pesticides
- Require trained workers
- Lack of effective or registered chemistries
  - ✓ Chloropicrin
- Limited residual effects
- Adverse environmental and human health impact



# Alternative “Fumigants”

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- Solarization
- Biofumigants (cover crops)
  - Brassicas/Canola/Rape
- Anaerobic soil disinfestation (ASD)



# Anaerobic Soil Disinfestation

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1. Incorporate a soil amendment
2. Irrigate the soil
3. Tarp soil for 3-5 weeks and secure edges
4. Plant

\* See factsheet HYG-3315





# Pre-Plant Disease Management

- Plant healthy, certified “pathogen-free” stock
  - 13 viruses
  - Phytoplasma diseases
  - Angular (Xanthomonas) leaf spot
  - Strawberry Crimp Nematode
  - Red Stele Root Rot



*Strawberry mild yellow edge virus*



*Angular leaf spot*

*Images courtesy of F. Louws, NC State*

# Pre-plant Disease Management

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- **Pre-plant Dips**

- Bare roots only (other wise use a drench)
- Plant immediately after dipping
  - **Anthraco nose crown rot:**
    - Abound and others
    - Switch
  - **Phytophthora crown rot, Red Stele, and Pythium root rot:**
    - Aliette
    - Phosphorous acid (i.e. Phostrol, ProPhyt)





# Strawberry Disease Management

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## Phytophthora crown and root rot and red stele:

- Perennial- one application in the spring and one post-harvest
- Annual- one application at planting and one 30-60 days later
- Aliette
- Phosphorous acid (i.e. Phostrol, ProPhyt)
- Ridomil Gold and others



# Strawberry Disease Management

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## Colletotrichum crown rot:

- More severe in warmer parts of Ohio
- Common in second year plasticulture plantings
- One or two applications in the spring
  - Switch
  - Captan
  - Topsin M
- *Save strobilurins (FRAC11) for anthracnose fruit rot*



## Midwest Fruit Pest Management Guide 2019-2020



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