Conifer Calamities

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October 28, 2021

Objectives
• Review some of the more commonly encountered problems on conifers
• Review aspects of their biology
• Review possible management practices

What is a conifer?
• Pines
• Spruces
• Firs
• Junipers
• Arborvitae
• Yews (Taxus)
• Hemlocks
• Douglas-fir
• Bald cypress
• Dawn redwood

What is the native habitat for our conifers?
Abiotic – Problems

- Planting Depth!
- Other Abiotic Problems
  - Drought Stress
  - Winter Injury
  - Salt Injury
  - Herbicide Damage
If it is not an abiotic problem, then what?

Rhizosphaera Needle Cast

• A fungus, *Rhizosphaera kalkhofii*

- Factors affecting disease development:
  - Plant selection
  - Needle wetness
  - Poor air circulation

The Disease Triangle

Three Critical Factors
Conifer Calamities

- Plant selection
  - Highly susceptible
    - Blue or Engleman
  - Moderately susceptible
    - White
  - Relatively resistant
    - Norway

- Poor air circulation
- Crowding

**Rhizosphaera kalkhoffii**

**Management**

- Sanitation
  - Removal of dead branches
- Reduce Needle Wetness
- Fungicides…maybe!

- Site Choice
- Plant Choice

**Maybe NOT Rhizosphaera?**

- Michigan State University did a survey
- Diaporthe sp.
- Almost identical field symptoms
- Fungus
- Needs more research

**Cytospora Canker & Needle Cast**

- Leucocytospora Canker
- Fungal disease
  - *Leucocytospora kunzei*
- Numerous hosts
  - Colorado spruce (*Picea pungens*)
- Symptoms
  - Limb dieback
  - Large quantities of white resin
Cytospora Canker

- Very prevalent in urban trees
  - Trees 15 yrs. old and older
  - Planted outside of their native range
  - Stressed
    - Injured by low or high temperatures
    - Droughty conditions
    - Poor nutrition
    - Mechanically injured

Symptoms

- Discolored foliage
- Premature defoliation
- Branch dieback
- Cankers

Management

- Sanitation
  - Removal of dead branches
- Reduce stress
  - Water during droughts
  - Avoid mechanical injury
  - Don’t prune during high infection periods
  - Mainly in the spring

Site Choice

Diplodia Tip Blight & Canker

- Diplodia = Sphaeropsis = Diplodia
  - Diplodia pinea = Sphaeropsis sapinea
- Fungus (Fungicide)
- Increasing amounts in landscapes & windbreaks
- Hosts: Austrian, Scots, Red, Ponderosa, Mugo and White Pines
  - Austrian and Scots Pines

- Tip blight is a spring disease
  - Pathogen overwinters on infected tissue
  - Produces spores in spring
  - Spring rains splash spores
Symptoms & Signs
- Tip Blight
  - Tip die back
  - Resin flows
  - Dead brown needles
    - Short, sharp dead needles in new candles
- Canker
  - Weeping cankers on stems
  - Limb die back
- Signs
  - Pycnidia on needles and cones

Management
- Plant non-susceptible hosts
- Avoid areas of prolonged wetness
- Remove nearby infected trees
- Avoid mechanical injury
- Sanitation
- Fungicide treatments
  - Early season when new shoots appear

Dothistroma Needle Blight
- Fungal disease
  - *Dothistroma pini*
- Primarily a pine disease
  - Unusual case of spruce (Norway and Colorado Blue)
- Symptoms
  - Dark green, water-soaked spots on needles
  - Reddish-brown bands
  - Partial needle browning

Management
- Two Fungicide Applications
  - 1st Mid May and 2nd mid to late June
  - Thorough coverage
- Fungicides
  - Copper-containing products
  - Chlorothalonil
  - Mancozeb
- Sanitation

Pine Wilt Nematode
- Pine (*Pinus* spp.)
- Pinewood nematode (*Bursaphelenchus xylophilus*)
Pine Wilt Nematode

- Transmitted (vectored) to conifers by pine sawyer beetles (*Monochamus* spp.)
- Primary transmission
  - beetles feed on the bark and phloem of twigs of susceptible live trees
- Secondary transmission
  - female beetles lay eggs (oviposition) in freshly cut timber or dying trees

- Nematodes introduced during primary transmission can reproduce rapidly in the sapwood and a susceptible host can wilt and die within weeks of being infested if conditions are favorable to disease development.

- Pine Wilt Nematode in vascular tissue of a pine

- Pine Wilt Nematode Management:
  - Remove and destroy dead/dying trees
  - Do not stack for firewood
  - No effective nematicide or insecticides
Armillaria root rot (various species)

Armillaria
- Can infect all conifers
- Unnoticed until tree fails or mushrooms appear

Key diagnostic features for Armillaria

Armillaria management?
None that is practical

Oak-Pine or Pine-Pine Rust
Sudden Needle Drop of Spruce (SNEED)

A 'disease' that hasn't panned out

Pathogenicity was not proven!