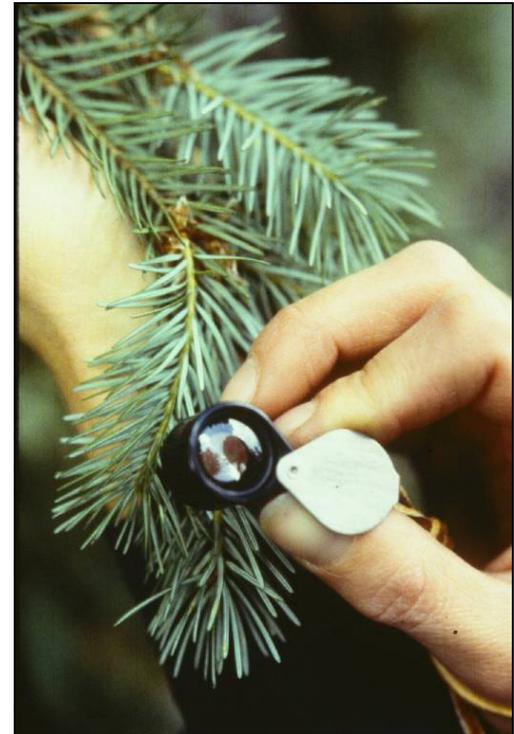


# 2012 Update on Christmas Tree Topics

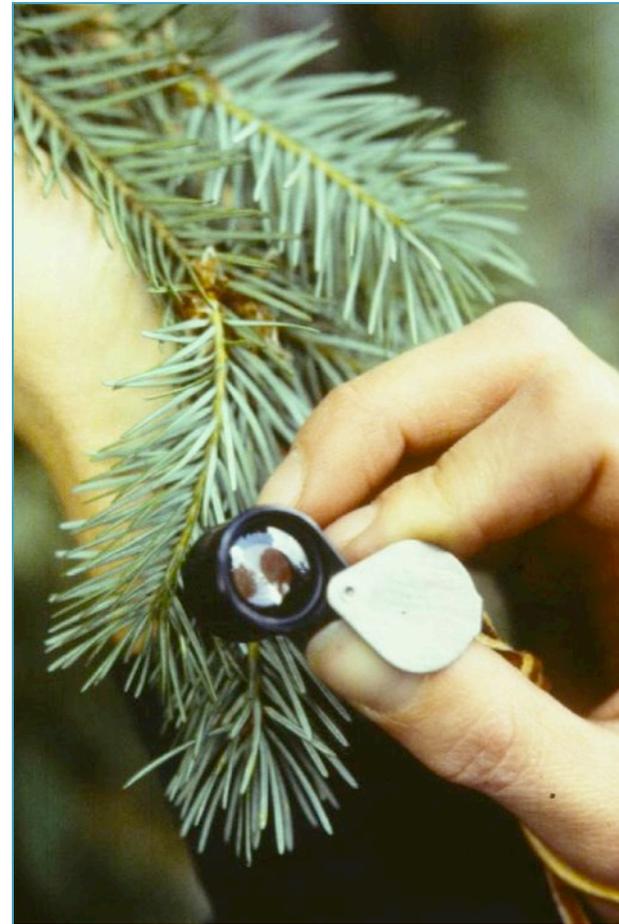
Chal Landgren  
OSU Extension  
Christmas Tree

W-E University  
1/23/13



# Today's Approach

- ❖ **2012 Export Overview**
- ❖ **Where to find help**
- ❖ **Selected diseases/insects-I.D., biology and management**



# Export Totals & Mexico for 2012



- ODA issued 3,048 state and federal phytosanitary certificates. An increase over past years
- Mx- I shipment rejected at Tijuana (midge)

# Hawai'i- Different Story



- 240 containers received (12/5/12)
- 93C held (mix of paperwork/ pest)
- 73C with pests. Slugs (*Arion sp.*)- were the major pest.
- Few yellow jackets

# Treatment in Hawai'i



# Treatment prior to shipping



- Shaking
- Baiting
  - Field and Landings
- Sanitation
  - AVOID CONTACT WITH GRASS/SOIL

# Why this year???



- Probably because the Mayan Long Calendar Ended (not really)

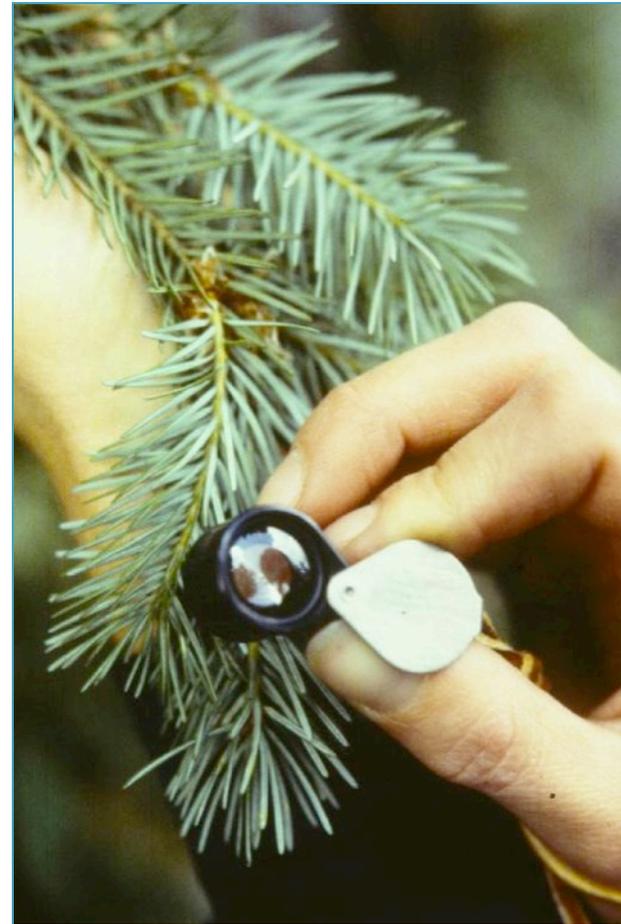
# Why does Hawai'i care



- Some genera are there now
- Slugs and Snails are carriers of rat lung worm.
- Rats in SE Asia are infected- slugs come along-people eat vegies with slime-meningitis-like problem

# Today's Approach

- ❖ **2012 Export Overview**
- ❖ **Where to find help**
- ❖ **Selected diseases/insects-I.D., biology and management**



# Example from PNW Insect Handbook

Christmas tree (Douglas-fir)—Douglas-fir needle midge

(Contarinia spp.) ID photos: Damage Immature DD model

Pest description and crop damage Adult is a small midge (fly). Larvae mine needles; they often appear as a purple node above which the needles are distorted.

Management—chemical control

Time applications based on adult needle midge trap catch. Time to coincide with adult emergence.

1. acephate (Orthene)

2. chlorpyrifos (Lorsban Advanced, Warhawk and others—Restricted use pesticide

1. 435 DDs after Jan 1: Approx. time to put up traps

2. 581 DDs after Jan 1: 5% adult catch in traps

3. 758 DDs after Jan 1: 50% or peak adult catch in traps

4. 927 DDs after Jan 1: 95% adult catch in traps



616-18

Pacific Northwest  
*Plant Disease*  
Management Handbook



# New Books



**CHRISTMAS TREE DISEASES**

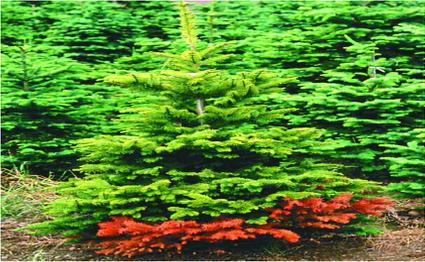


## Phytophthora Root Rot

*Phytophthora spp.*

**Host:**  
Most Christmas tree species





**SIGNS & SYMPTOMS**

- Reduced or stunted growth
- Needle loss and lost of color
- Root decay
- Bleeding basal cankers
- Dead branches at the base

**WHERE TO LOOK**  
 Low-lying areas with poor water drainage



and v



### Phytophthora Root Rot: MANAGEMENT CALENDAR

JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
			SYMPTOMS-A								
			MONITORING-B								
			MANAGEMENT D					MANAGEMENT D			

**KEY:**  
 A = Trees dying, yellowing, cankers, root rot  
 B = Scout for symptoms  
 C = Plant resistant species  
 D = Improve drainage

**SCOUTING**

1. Cut the tree and check cambium for presence of canker.
2. Dig roots and check for dark and rotten roots.



**SUSCEPTIBILITY**

HIGH
LOW

Noble fir

Douglas-fir

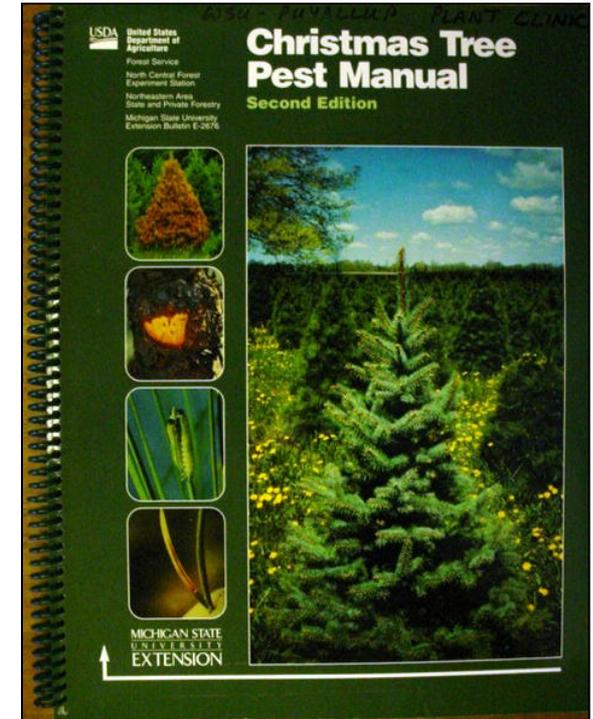
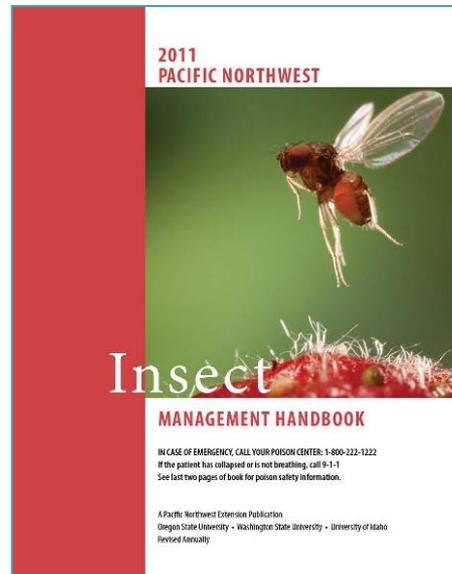
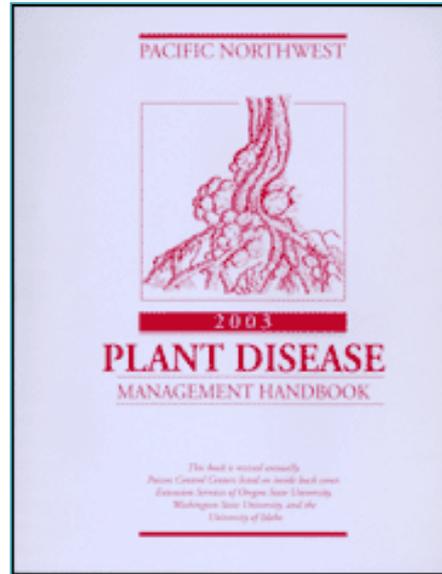
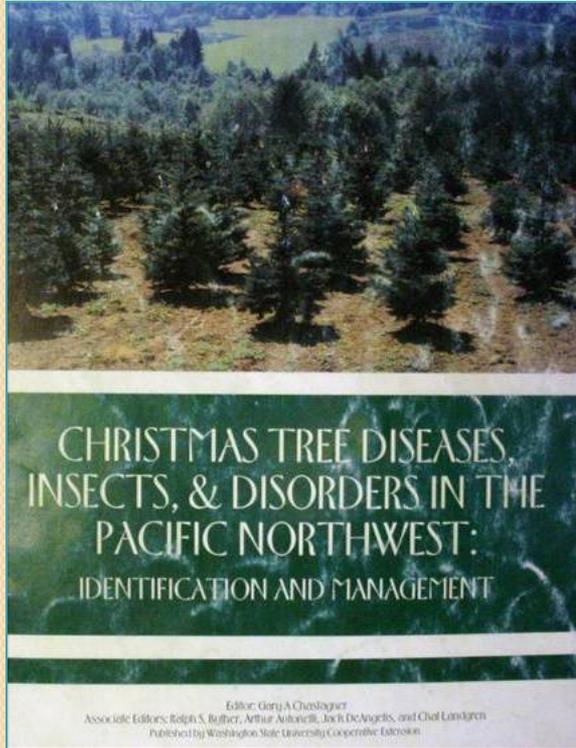
Grand fir

Nordmann-Turkish

**MANAGEMENT OPTIONS**

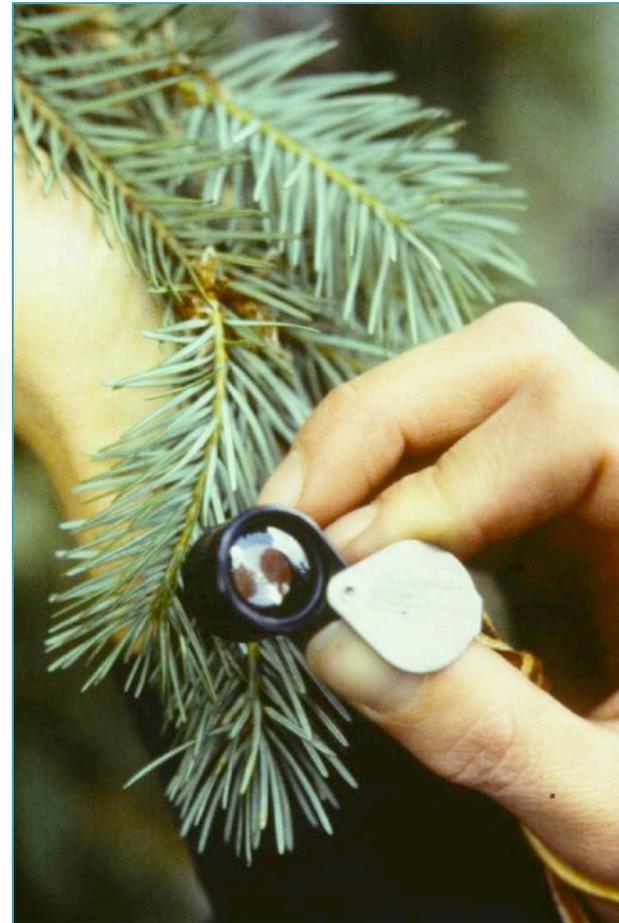
1. Replant with resistant stock.
2. Improve field drainage (tiling, ditches).

# Additional Resources



# Today's Approach

- ❖ **2012 Export Overview**
- ❖ **Where to find help**
- ❖ **Selected diseases/insects-I.D., biology and management**



# Diagnosis-the start

- Stage 1- “All my trees are dying. The neighbors’ trees are next. Then the country is in danger”
- Stage 2- “OK, let’s take a close look”
- Stage 3- “Lots of questions, lots of detective work and thinking back
  - Weather, site history, pattern, distribution, position on tree, timing, and more

# Diagnosis- tips

- You need to know what “Healthy” looks like and how trees grow.
  - Branches- needle color, age and length are important indicators.
  - Stems- Outward signs of pitch, sunken spots, healing. Check a cross section
  - Roots- Hard to get..... But need to know color, # of fine root hairs, when (or if) they grew

# Diagnosis

- **Distribution**
- **Age of needles**
- **Timing**
- **Pattern**



# Abiotic Disorders- (A.K.A. mistakes)



# Abiotic Disorders

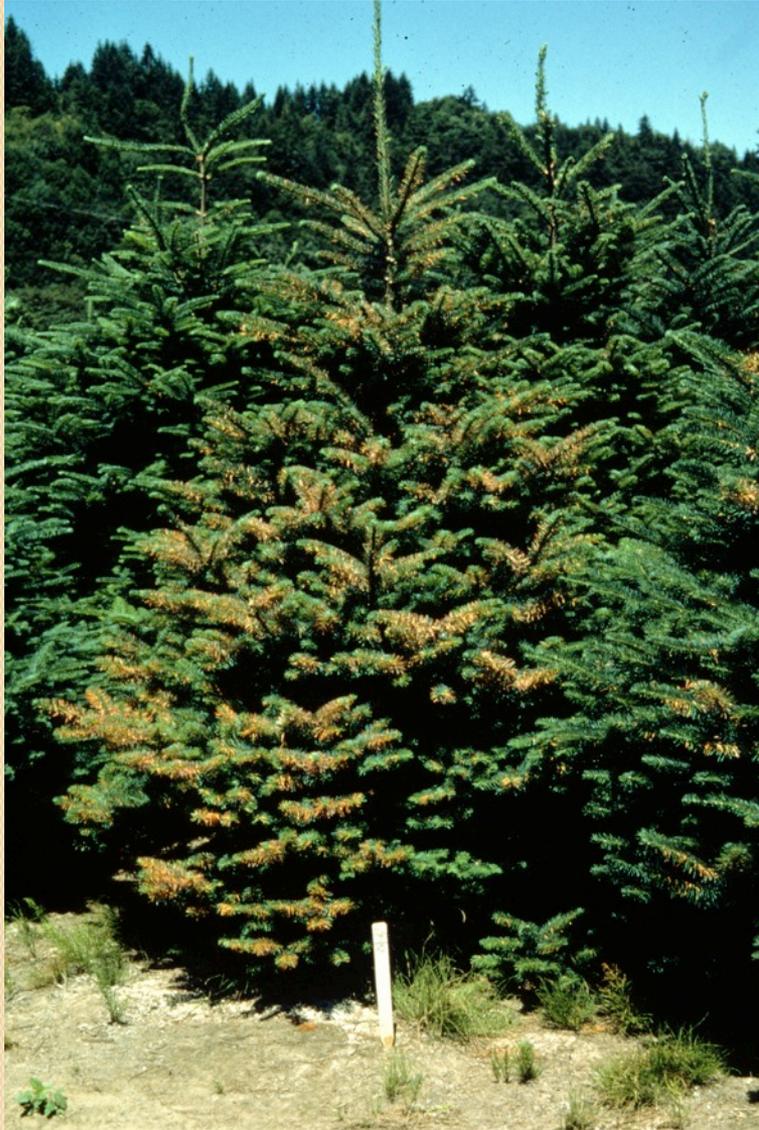


# Abiotic Disorders or who knows?



# Abiotic Disorders

...at least I know not to spray



# Aphid vs. Adelgid

## Adelgids are Woolly & Waxy



# A “new” aphid



# Biological Control- in season help Aphids



normal



Fungus

Aphid populations build rapidly, but also shrink in response to the effects of naturally occurring biological control

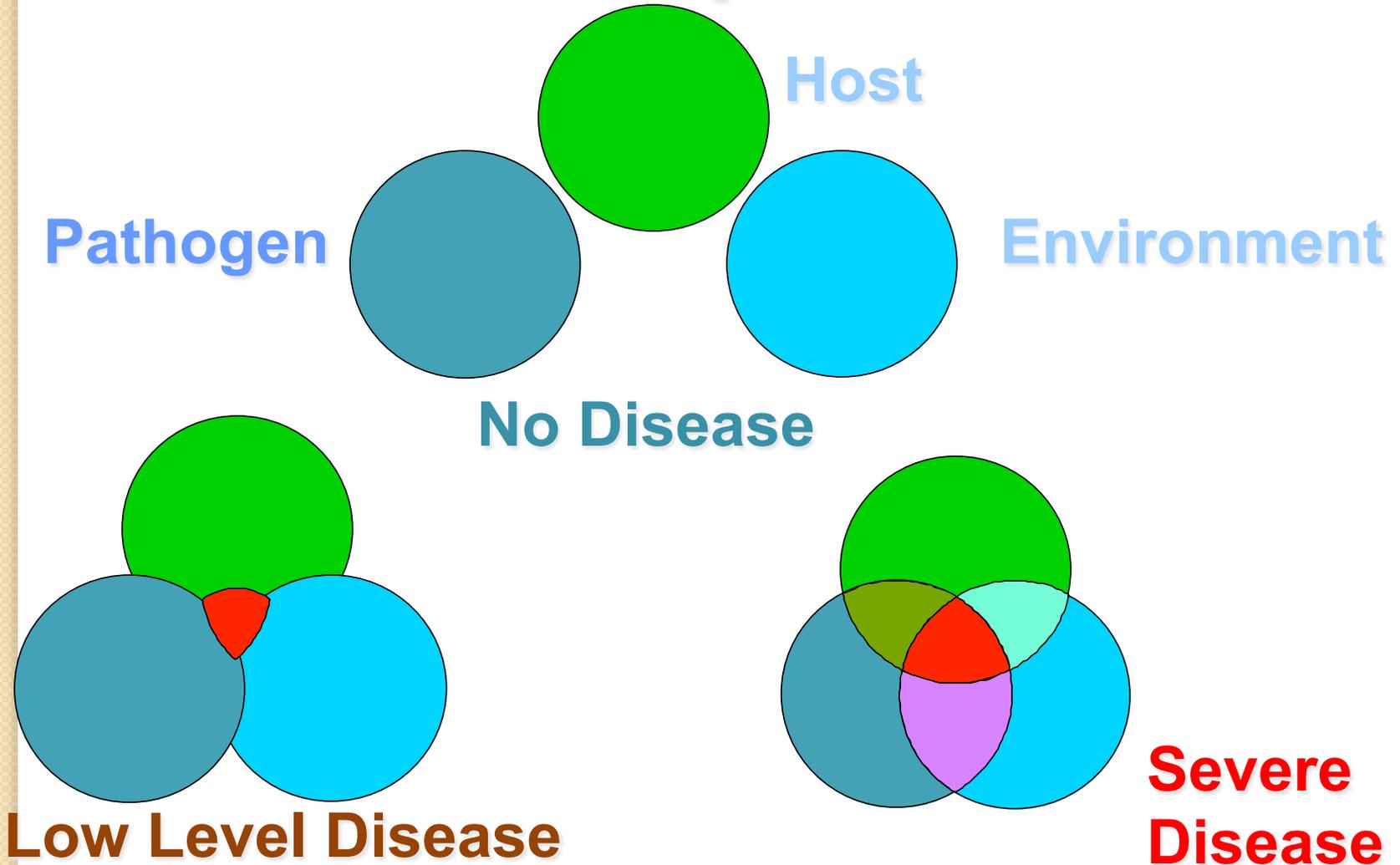


parasitic wasp

Lady beetle

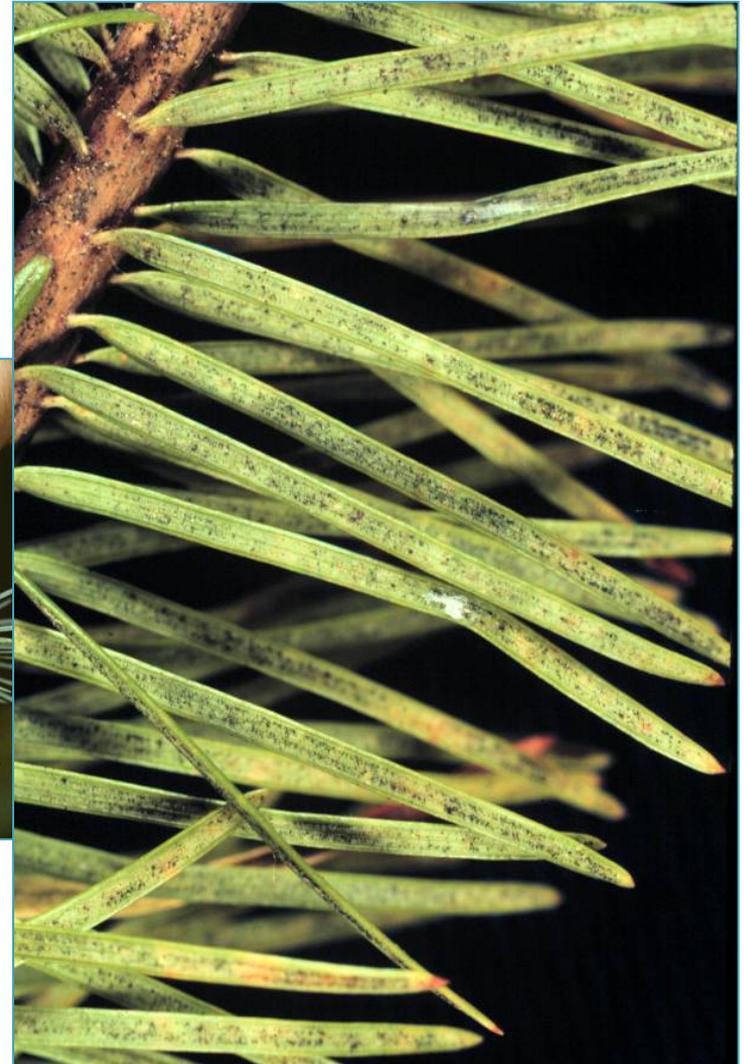
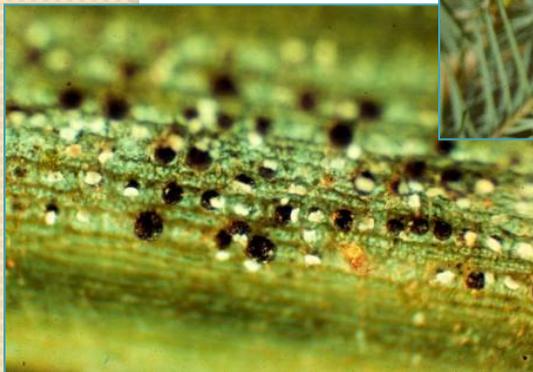


# Disease Development Principles



# Sorting it out--Monitoring

- ❖ Visual inspection
- ❖ Trapping
- ❖ Laboratory testing



# Integrated Disease Management

## ❖ Cultural Methods

(site selection, stump removal, sanitation, drainage, etc.)

## ❖ Biological Methods

(beneficials, resistance, etc.)

## ❖ Chemical Methods

(fungicides, insecticides, etc.)

# Laminated root rot



- Need to look for clues
- Noble fir-  
intermediate
- Grand, Douglas-fir,  
white fir- prone
- Push your trees over
- Dig some up

# Interior Needle Blight



# INB Symptoms

**Most prominent during late summer and fall**

- **Random browning of older needles, mostly on lower branches**
- **Initially, symptomatic needles tend to remain firmly attached to branches**



# Interior Needle Blight

several fungi

*Mycosphaerella* spp.

*Phaeocryptopus nudus*

*Phyllosticta abietina*

*Taxosporium* spp.

*Rhizosphaera* spp.

- Noble and grand fir

# INB on Grand Fir



# **Disease Management Cultural**

- **Promote air circulation**
  - **Timber**
  - **Weed control**
  - **Basal pruning**





## **Disease Management: Chemical**

- **Chlorothalonil fungicides**
- **One to two applications**
- **Benefits not evident until about 1½ years.**

**Unsprayed**



**Sprayed**



**Noble Fir**



## Chlorothalonil sprays can injury some conifers

Noble fir, white fir, Black Hills  
and Blue Spruces

**Blue Spruce**



# Swiss Needle Cast (SNC)

*Phaeocryptopus gaeumannii*



# Swiss Needle Cast

*Phaeocryptopus gaeumannii*

## Disease Cycle



Fruiting bodies begin to appear on infected needles during early winter.



Spores are produced in the spring and maximum production occurs during bud break



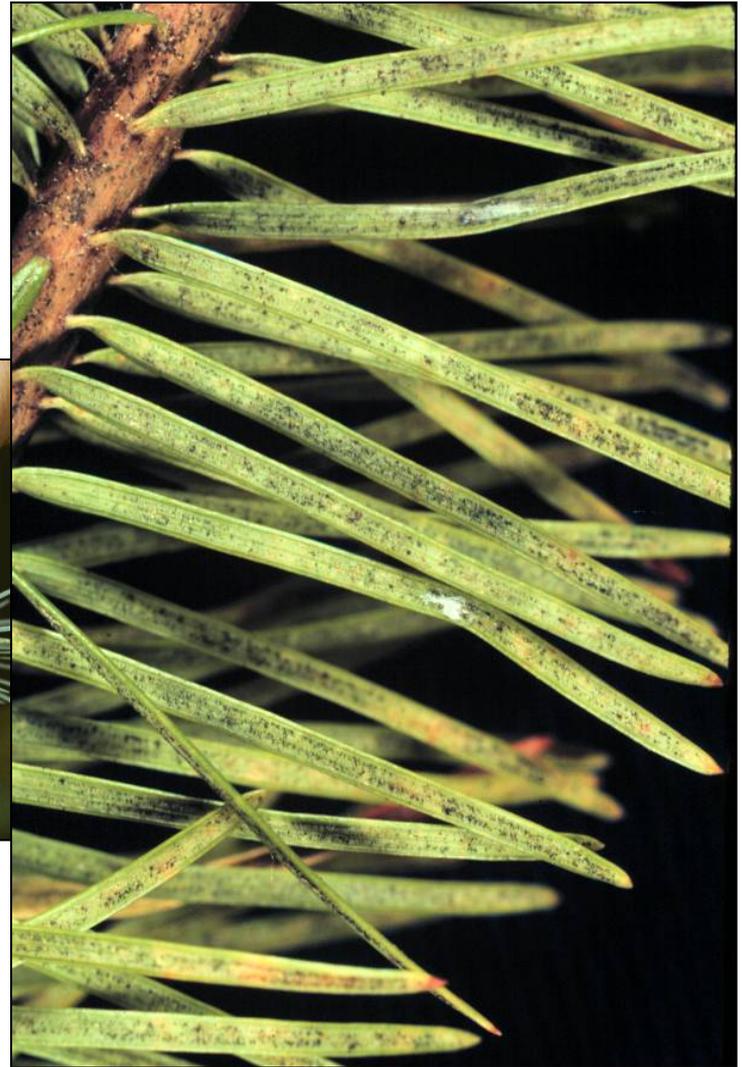
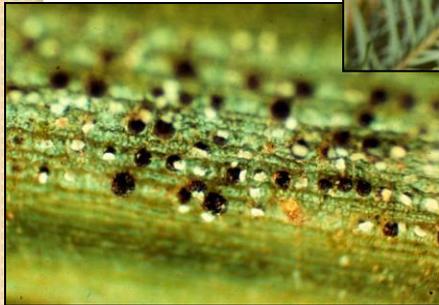
Under moist conditions, spores infect newly emerging shoots



Symptoms generally appear during early spring about two years after infection

# Disease Monitoring

Monitor trees for SNC by looking for fruiting bodies on older age classes



# Disease Management

- A number of fungicides are available to control SNC.
- Chlorothalonil based products are very effective if applied by ground or air.
- Spray when the new growth is about ½ to 1” long.
- Usually a single spray is all that is needed.
- Under high disease pressure, apply two sprays



# Rhabdocline Needle Cast

*Rhabdocline pseudotsugae* and  
*R. weirii* with five subspecies

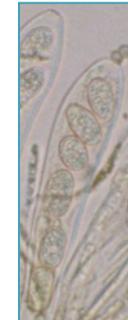


# Rhabdocline Needle Cast

## Disease Cycle



Fruiting bodies begin to appear on infected needles prior to bud break



Spores are produced in the spring and maximum production occurs during bud break



Symptoms generally appear during late winter/early spring about 7-9 months after infection



Under moist conditions, spores infect newly emerging shoots

# Integrated Disease Management-

- Plant resistant seed sources
- Remove highly susceptible trees
- Protect trees with fungicides



# Diseases - Needle Rusts

*Uredinopsis pteridis*

(grand, Shasta, and white fir)



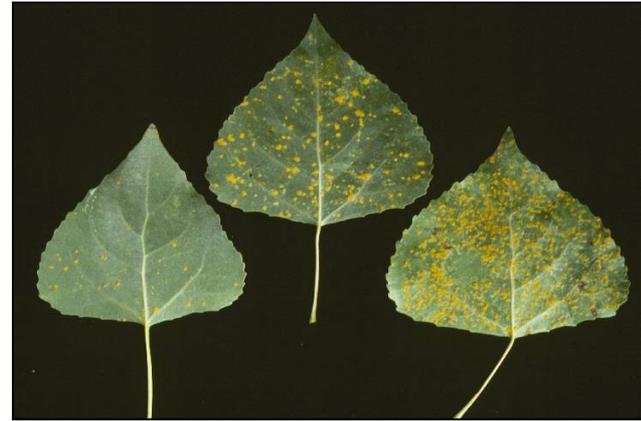
*Pucciniastrum goeppertianum*  
(grand, noble, and Shasta fir)



*Melampsora occidentalis*  
Douglas-fir



# Melampsora Rust





# Common “issues” with needle rusts and casts

- **Need to think 1-3 years in advance**
- **Monitor low spots, edges**
- **Fungicides protect new foliage**



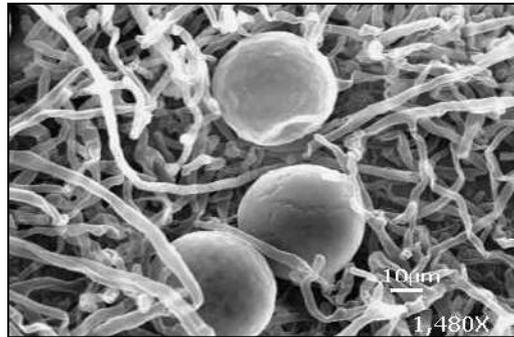
# Phytophthora Root Rot & Stem Canker



# Identification of Phytophthora root rot



# Phytophthora Life Cycle

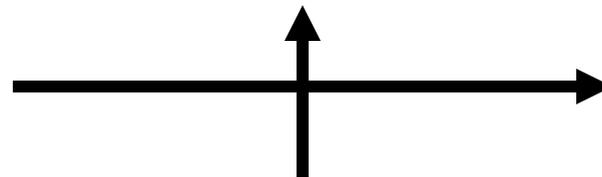
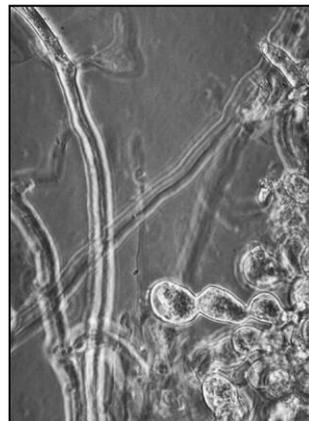


Survives as thick walled chlamydospores in roots or soil

Sporangia produce swimming zoospores which infects hosts



Symptoms result from mycelial growth in host tissue



Some species produce sexual oospores

**Overhead irrigation of trees with contaminated water can result in direct infection of branches by *Phytophthora***



***Phytophthora* occurs in areas with poor soil drainage and can infect seedlings in nurseries, transplant beds, and plantations**



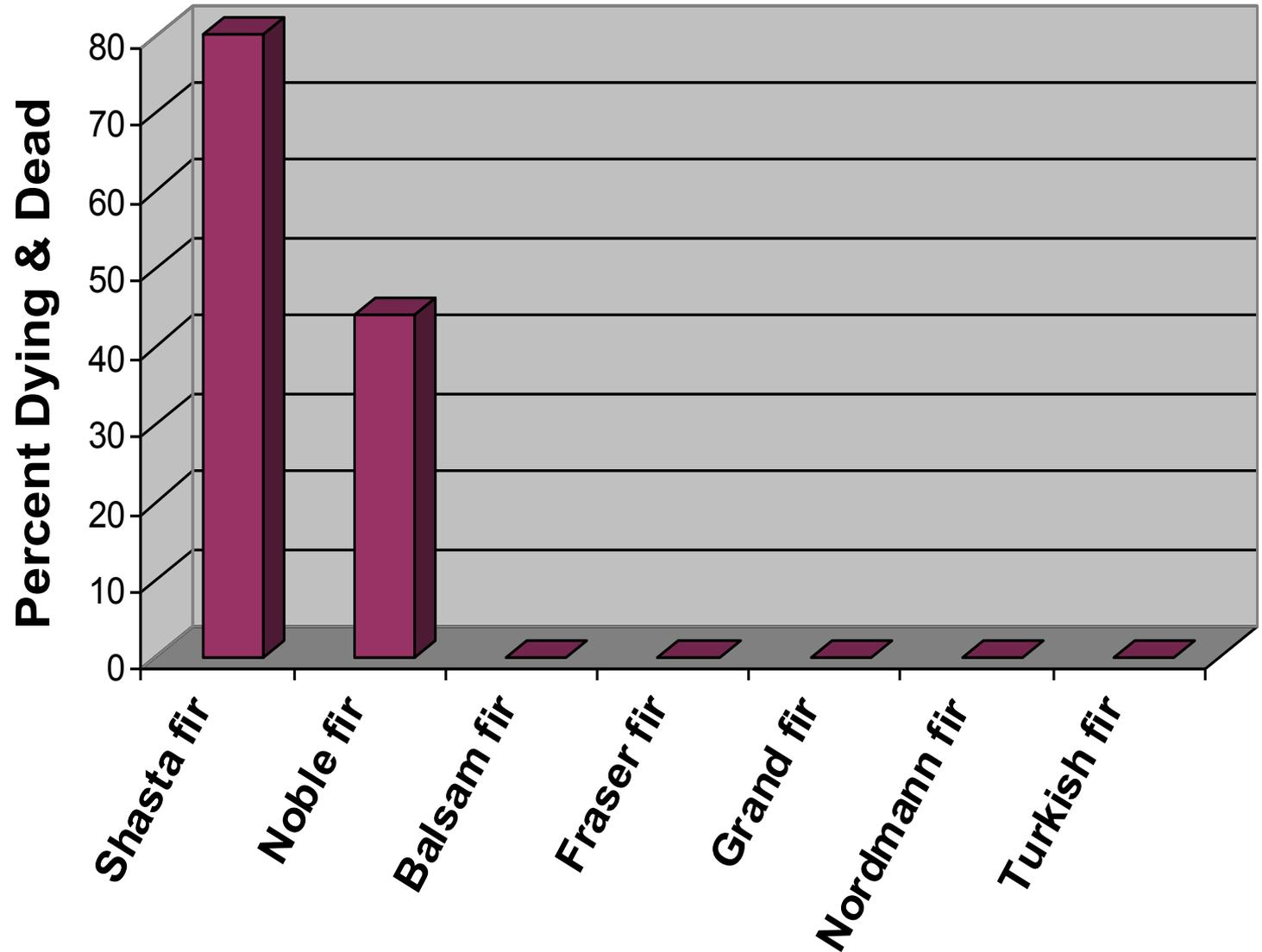




**Shasta fir**



# Phytophthora Root Rot Susceptibility



# Flood Irrigation to Promote Root Rot





**Annosus Root Rot**  
***Heterobasidion annosum***







# Spread of Annosus Root Rot by Spores During Harvest



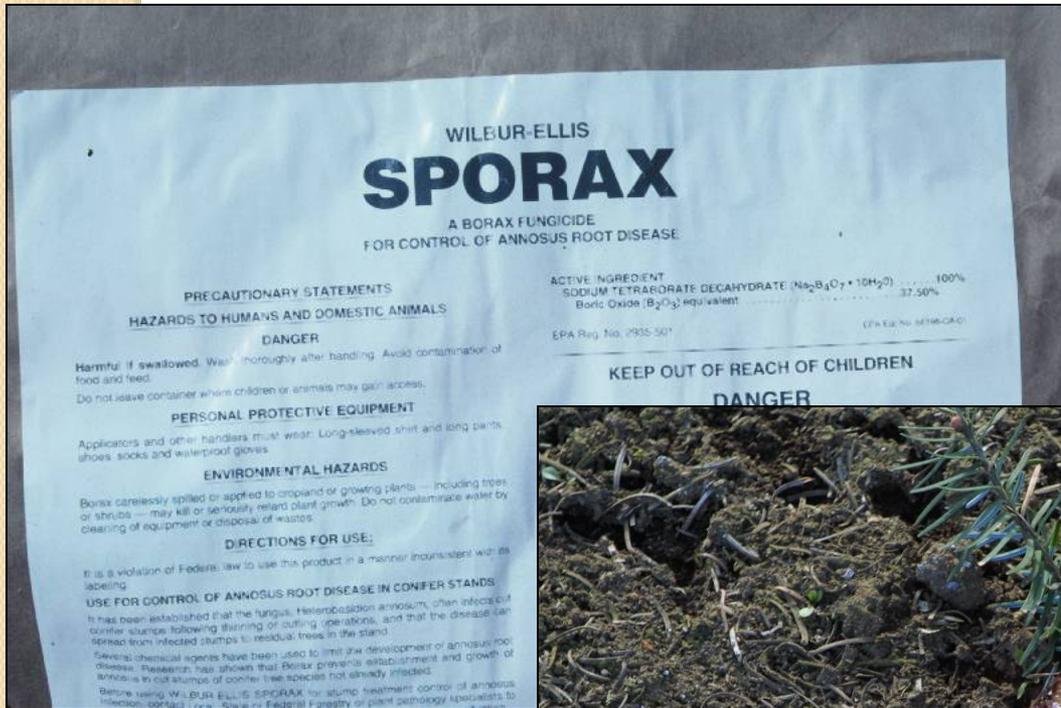




## **Management of Annosus root rot**

- **Plant resistant trees**
- **Monitor for disease at harvest**
- **Treat freshly cut stumps to prevent spore infection**
- **Prevent root-to-root spread of disease**
  - **Removal of stumps and roots**

# Potential Stump Treatments



- Sporax
- Urea spray (20%)
- Soil





**Stumps not removed**

**Stumps removed**

# Grovesiella Canker

## *Grovesiella abieticola*

**Hosts - True firs, white and Shasta fir are very susceptible**





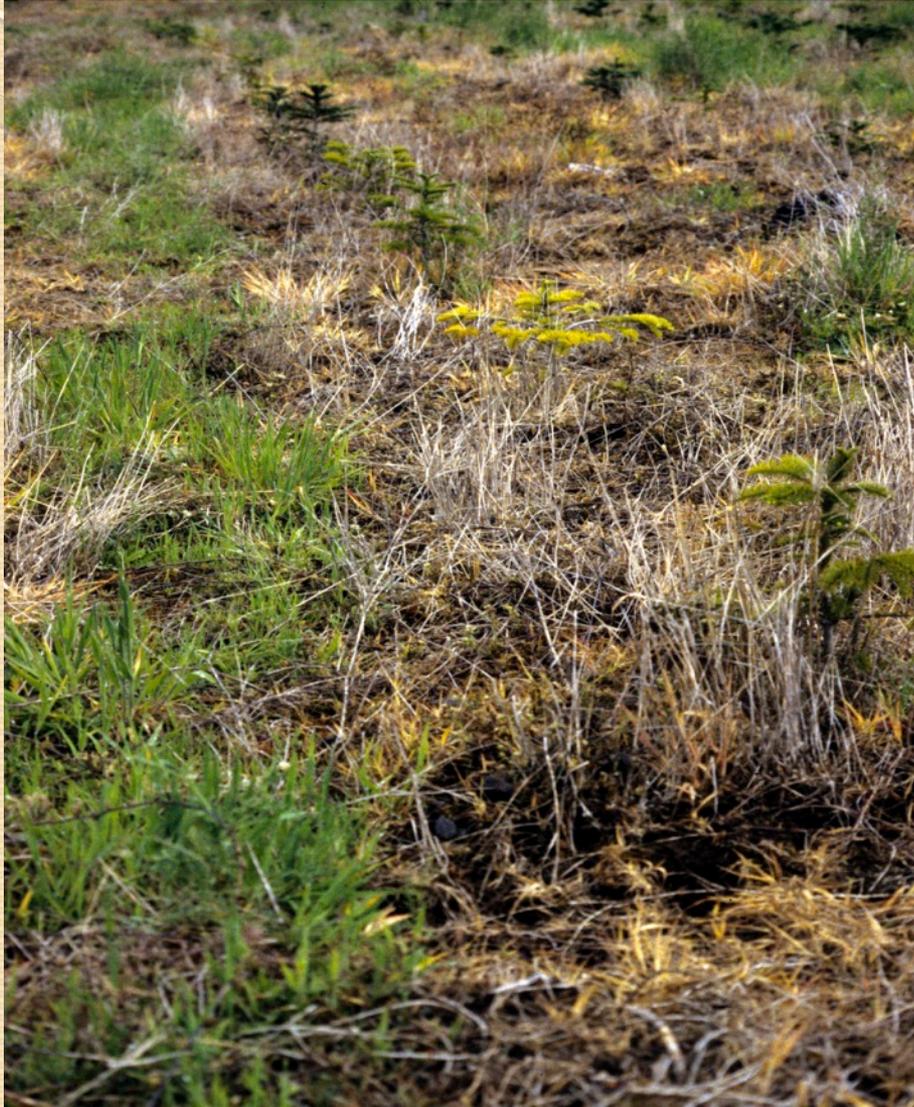
# Disease Management

- **Remove and destroy diseased trees (do not interplant)**
- **No effective fungicides**

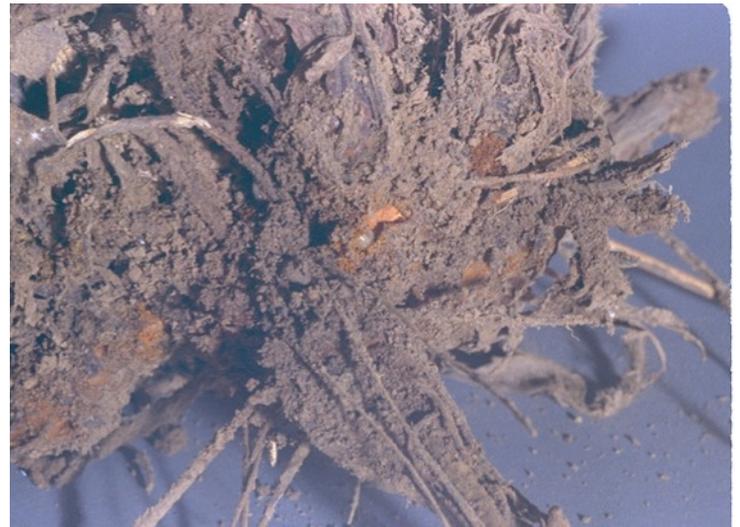


# Back to insects now....

## Root Aphids

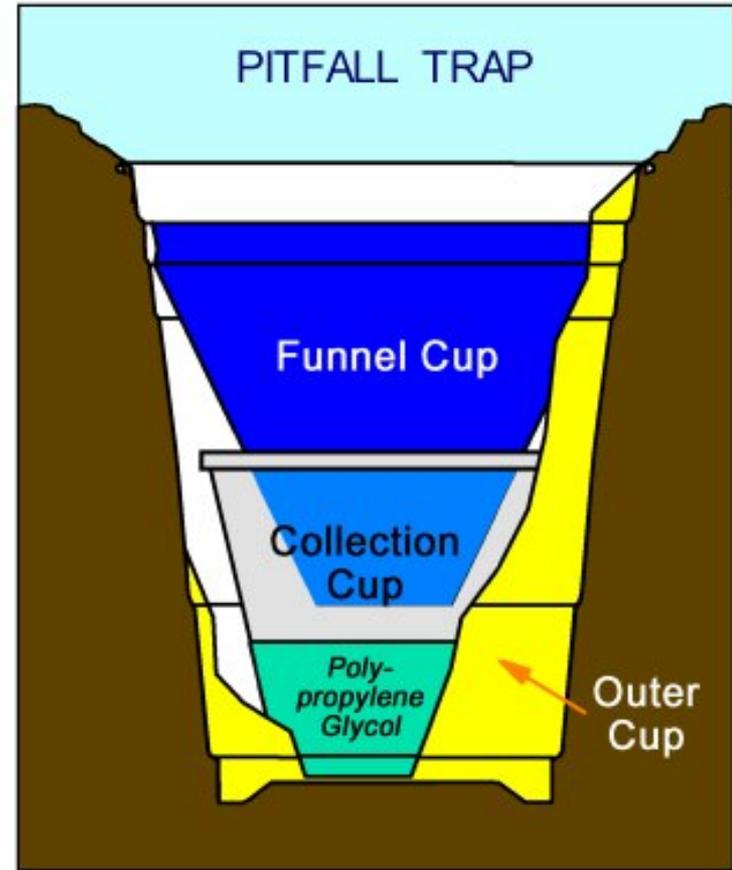


# Strawberry, Black Vine Root Weevil



# Root Weevil Scouting

- Previous crop
- Look for leaf damage on adjacent foliage
- Look for “notching” on needles of conifers!
- **AT NIGHT:** use beating sheet or sweep net foliage (10pm to 2am)
- Pit fall traps

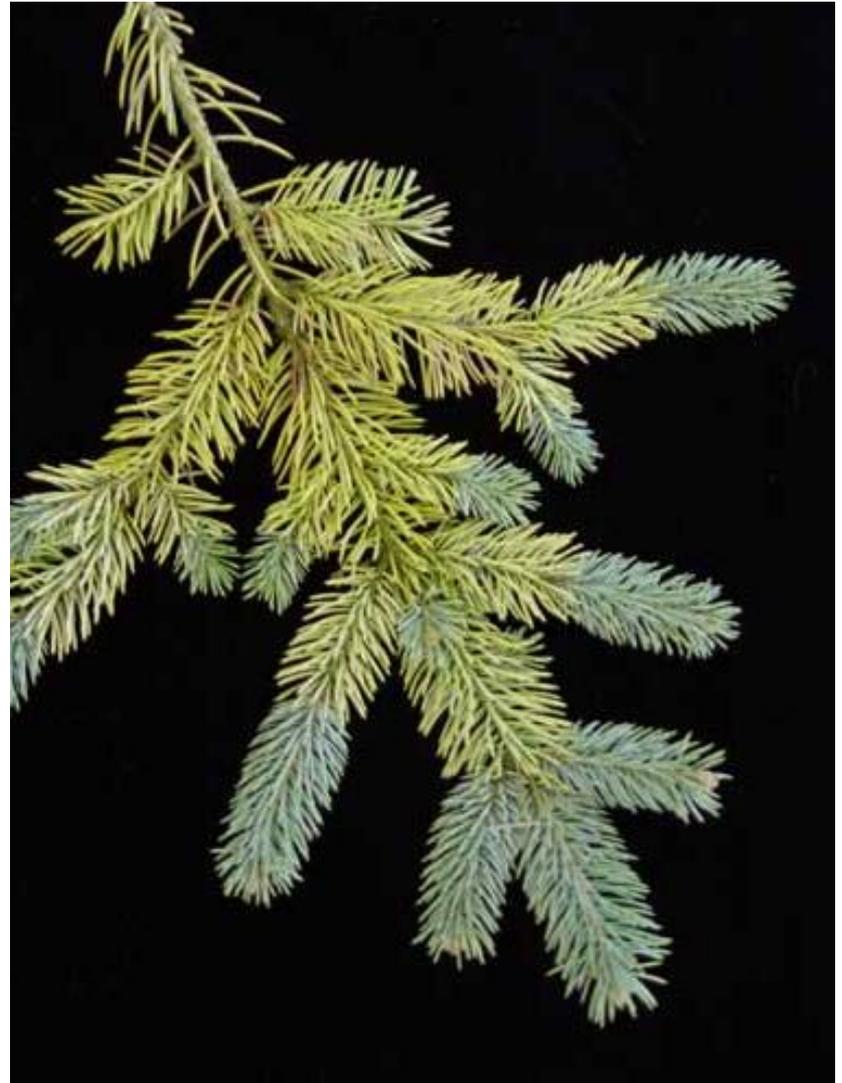


- Place rim even with soil surface
- Make a roof to keep rain out
- Inspect 2x/ week

# Chemical Control

- acephate (orthene and others)
- bifenthrin (Brigade 2EC and others)—  
Restricted use pesticide.
- dinotefuran (Safari 20 SG)
- esenvalerate (Asana XL and others)—  
Restricted use pesticide.
- permethrin (Perm-up 3.2 and others)—  
Restricted use pesticide

# Eriophyid Mite Damage



# Eriophyid Mites

Noble fir:  
Nalepella

Doug-fir:  
Epitrimerus



# Eriophyid Mites

- Determine if Off-color due to *these* mites
- Chemical Control
  - carbaryl ( Sevin and others)
  - fenpyroximate (Akari 5SC)
  - horticultural oil (test for phytotoxicity prior to widespread use)
  - spirodiclofen (Envidor)

# Scarab Beetles, Chafer Pleocomma (Rain Beetles)



# Scarab beetles, Pleocomma



# Pleocomma or Rain Beetles

- Scarab beetles- the “Dung Rollers”!
- Occur on most all native trees and shrubs
- Once thought to be an appropriate state insect. Hah!
- Flightless females are found by winged males
- Female mates and lays eggs in soil tunnels
- Larvae can live 7 or more years in soil!

# Pleocomma or Rain Beetles

