

Plant Disease and Diagnosis



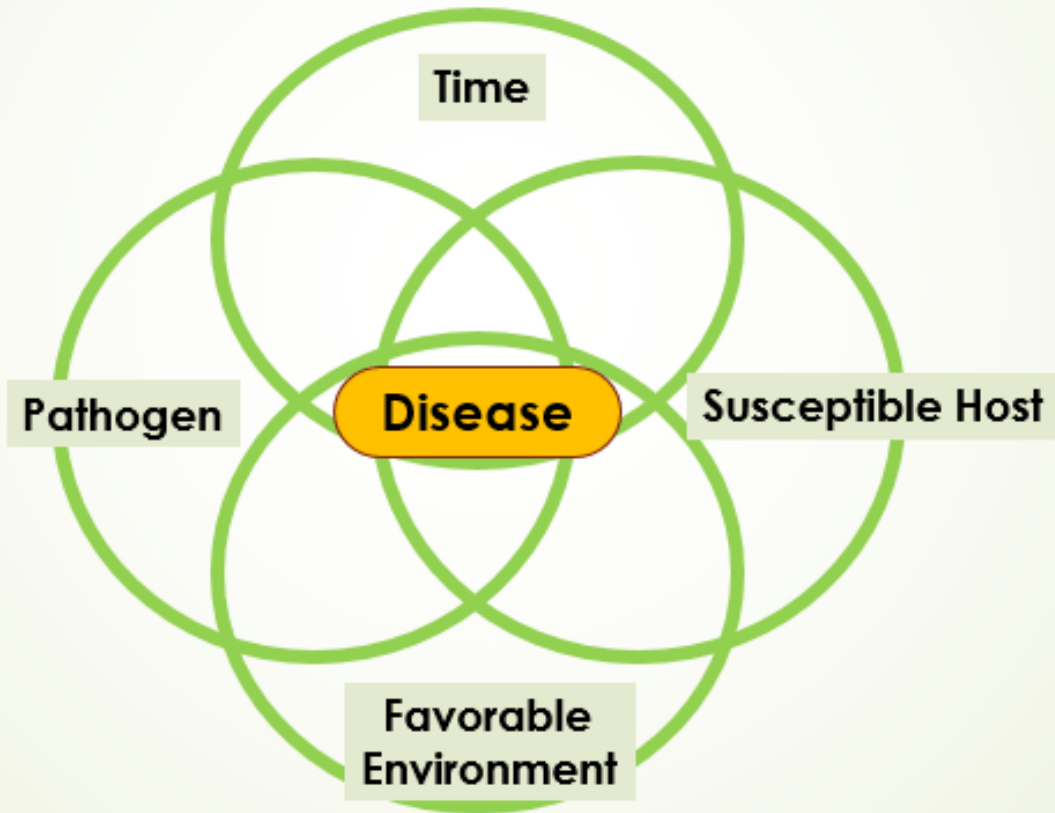
This presentation is adapted from a Washington State University program on Plant Disease.

Definitions and Plant Pathology Terms

- **Plant Pathology** – The study of Plant Diseases
- **Plant Disease** – Any physiological or morphological change in a plant that results in abnormal appearance or development
- **Pathogen** – An organism that causes disease
- **Symptom** – Abnormal appearance of a plant
- **Sign** – The actual pathogen (fruiting bodies, spores, hyphae)

- **Infected** – Disease presence
- **Infested** – Insect presence

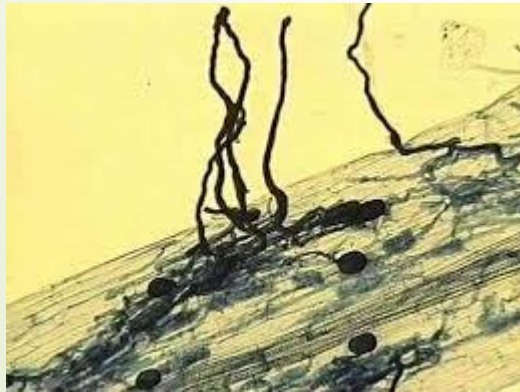
Components of a Plant Disease



- **Pathogen:** Fungi, Bacteria, Virus, Nemaode, Mycoplasma Spiroplasma
- **Host:** Susceptible Plant or Crop
- **Favorable Environment:** Air Temperature, Soil Temperature, Soil Fertility, Soil Type, Soil pH, Rainfall, Relaiive Humidity, Soil Moisture
- **Time:** period of time to establish

Disease Classes

- Biotic (Transmissible) ~ 30%
- Abiotic (Not Transmissible) ~ 70%

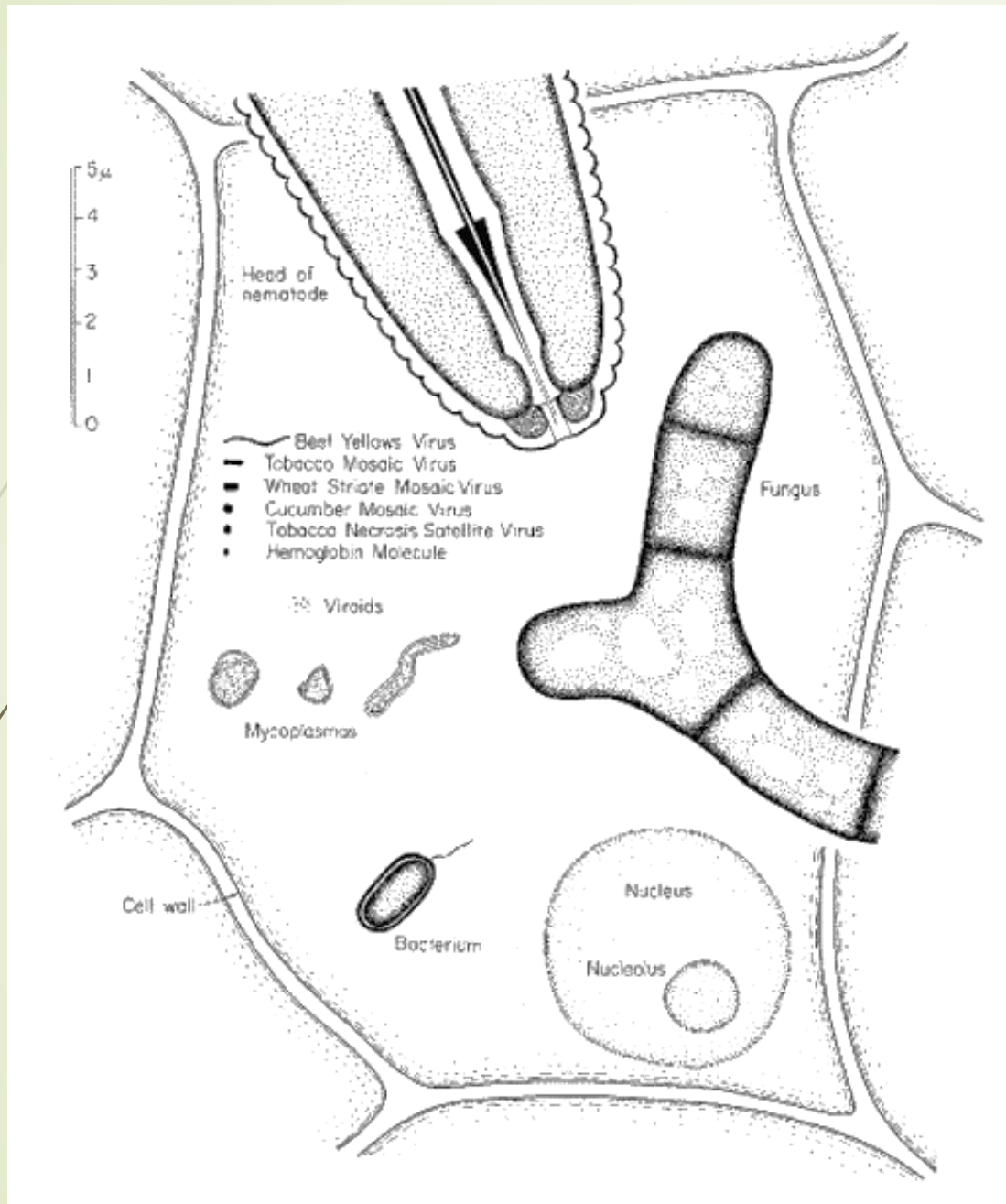





Causes of Abiotic Diseases

- Environmental (freezing, flooding, drought, light, wind, hail)
- Cultural (mechanical damage, planting problems)
- Chemical (fertilizers, herbicides, pests)
- Physiologic Disorders (abnormal growth due to genetic and/or environmental interactions)

Some Plant Pathogens Illustrated





Plant Disease Groups (By Signs & Symptoms)

- Leaf Spots
 - Leaf & Shoot Blights
 - Mildews
 - Rusts
 - Cankers
 - Root Rots
 - Wilts
 - Galls
 - Mosaics & Ringspots
- 

Leaf Spots

➔ Cause Fungi & Bacteria



Black Spot Rose



Tar Spot Maple



Apple Scab





Leaf and Shoot Blights

➤ Cause – Fungi and Bacteria

➤ Symptoms –

➤ Larger areas of leaves (not circular) and shoots showing localized discoloration and or flagging

Sycamore Anthracnose



Bacterial Blight Pear



Tip Blight Pine



Gray Mold Strawberry (fungal)



Dogwood Anthracnose



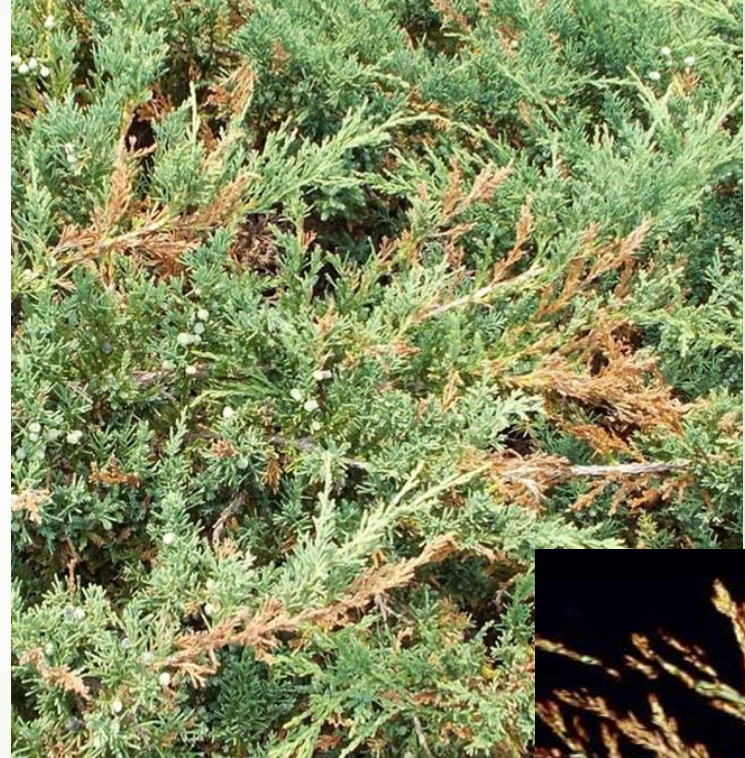
Late Blight Tomato (fungal)



Needle Cast



Tip Blight Juniper



Hmmm.



Wilts

- Cause – Fungi (Verticillium, Fusarium)
Bacteria
- Signs & Symptoms
 - Vascular Plugging
 - Wilted leaves & Shoots



Redbud Wilt



Verticillium Wilt

- Symptoms

- *Wilting
 - *Yellowing, small leaves

- *Excessive fruits
 - *Leaf scorch
 - *Dieback

- Signs:

- Sapstreaks – green black, blue

- Factors of Severity

- Previous land use – common in herbaceous plants

- High nitrogen detrimental

- Wounding of roots by cultivation practices

- Nematodes

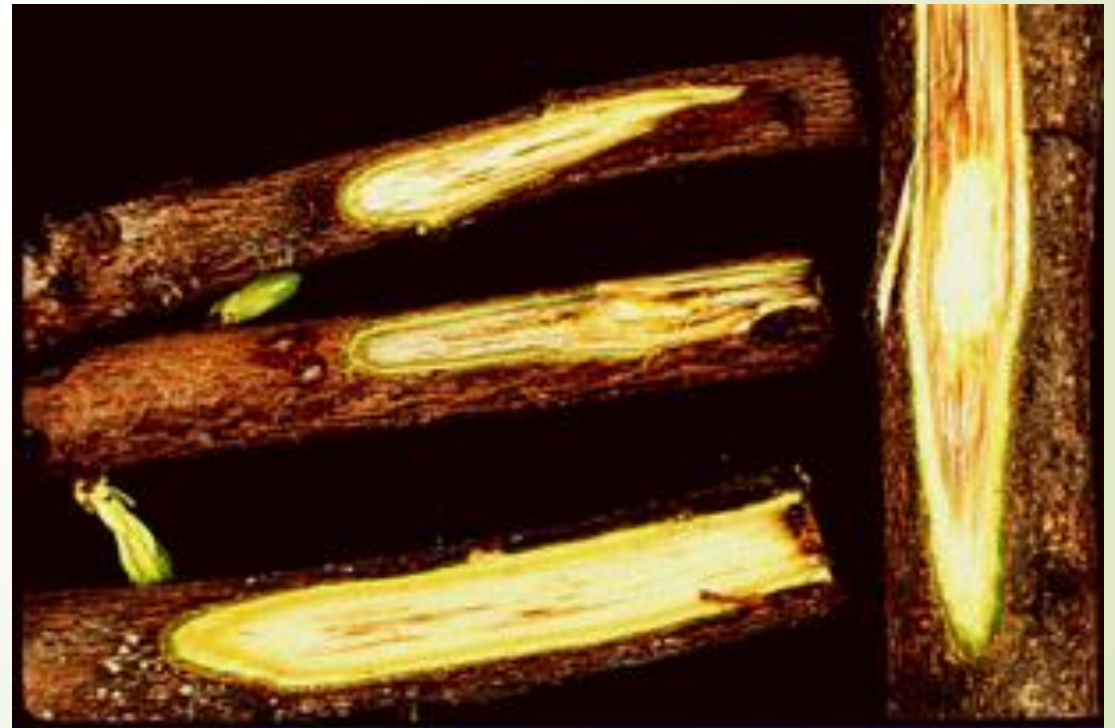
- Resistant varieties



Bacterial Wilt Geranium



Dutch Elm Disease



Galls



- **Cause – Fungi, bacteria, insects, mites, nematodes and abiotic factors**
- **Symptoms – Abnormal proliferation of plant tissue specific to a certain plant organ (leaf, stem, crown, or root).**

Azalea Leaf Gall



Almond Leaf Curl



Western Gall Rust of Pine





Crown Gall of Rose (Bacteria)



Black Knot of Cherry (Fungus)



Rusts

- Cause - Fungi
- Signs & Symptoms –
 - Fungal spore masses in yellow, orange, white, brown and black on leaves and stems



Simplified Life Cycle of White Pine Blister Rust (*Cronartium ribicola*)

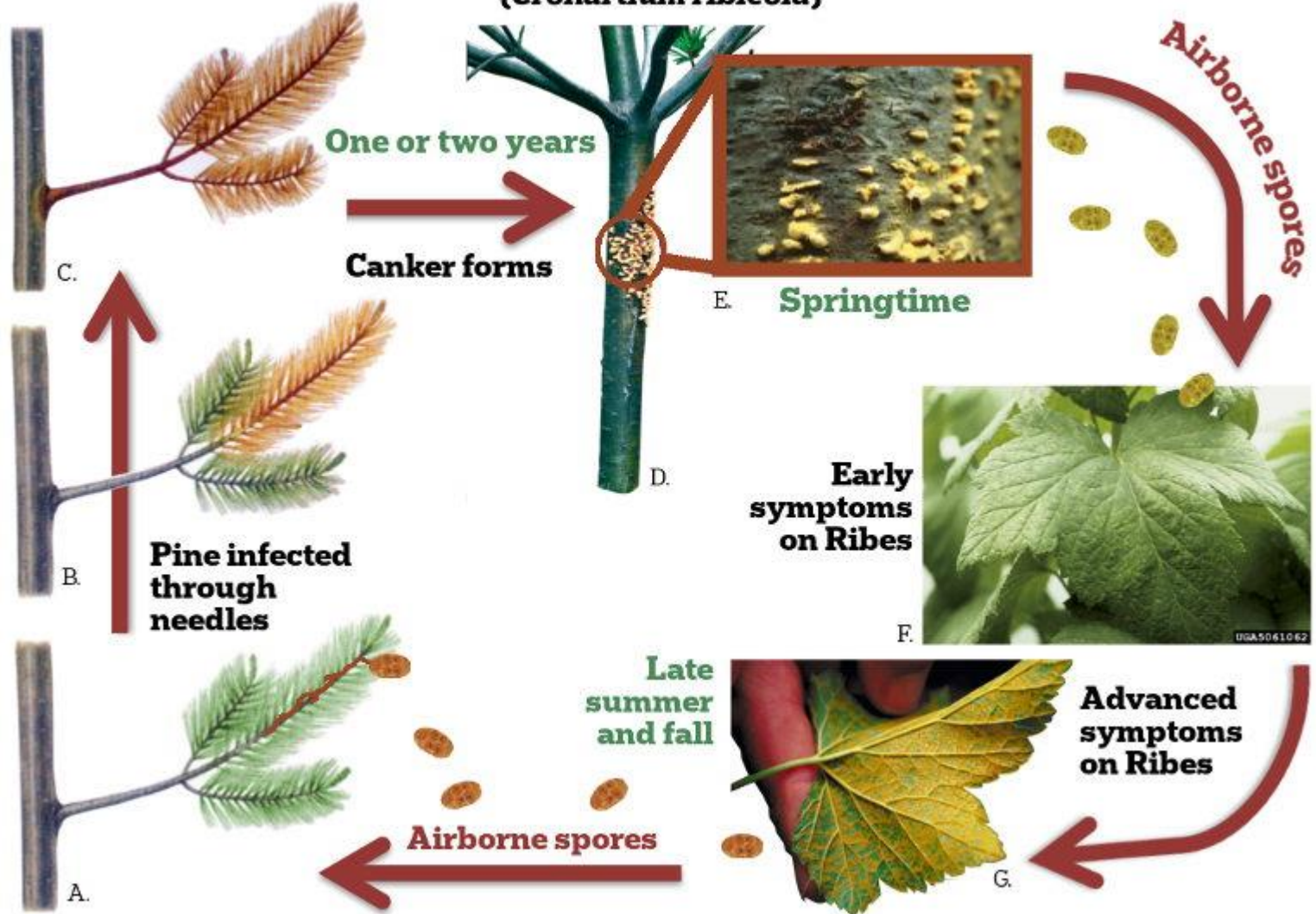
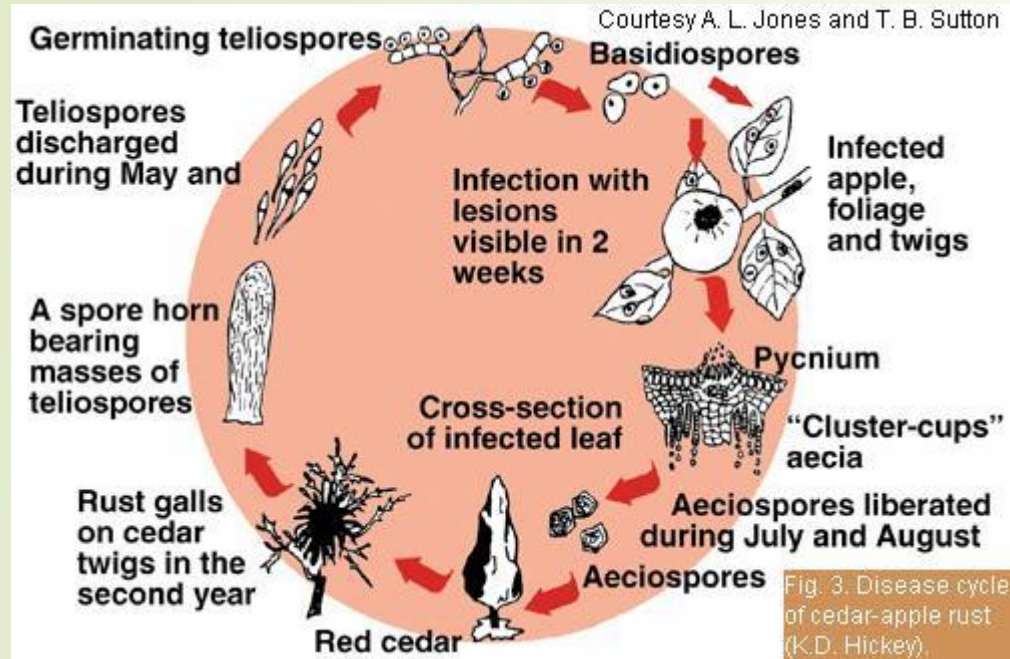


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Cedar Apple Rust



Canker - Sore

- Cause – Fungal, Bacterial, Physical Damage, Herbicides



Bacterial Canker Cherry



European Canker Apple and Pear



Spruce Cytospora Canker



Phytophthora Canker / Root Rot



Mildews

- Cause – Fungi
- Types –
 - Powdery Mildew “ Dry”
 - Downey Mildew “Wet”
- Signs and Symptoms –
 - Chlorosis, yellowing or purple blotches on leaves. White hyphae an fruiting bodies (fuzzy looking) on plant leaf surface



Powdery Mildew Phlox



Downey Mildew Cucumber

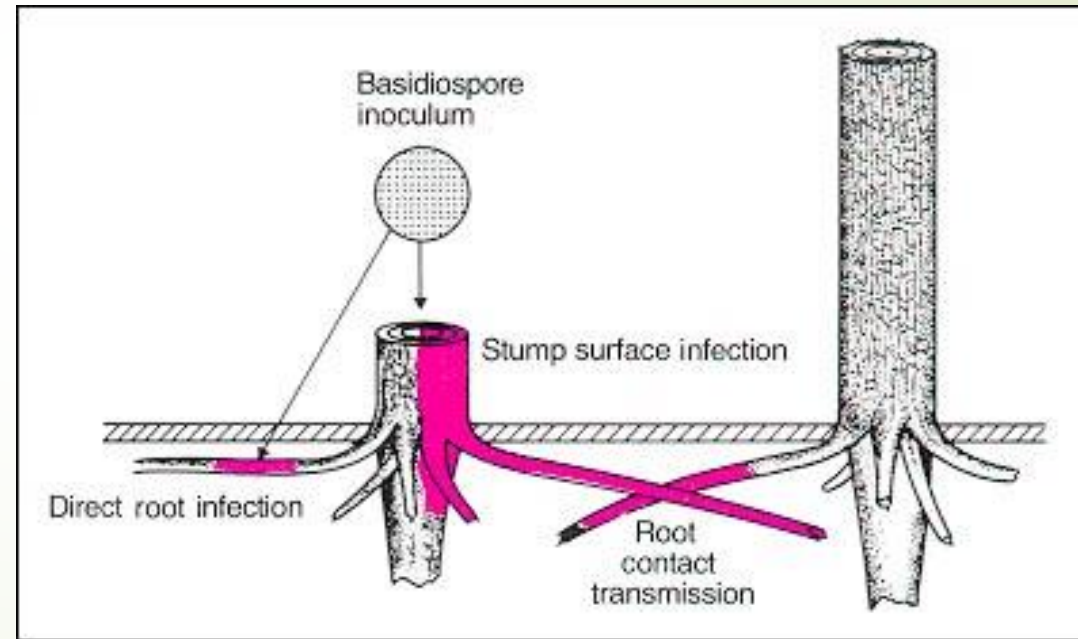


Root Rots

- **Cause – Fungi (Armillaria, Phytophthora, Sclerotinia), and Bacteria (Erwinia)**
- **Signs and Symptoms**
- **Shoot Wilting, Chlorosis/Necrosis, Stem & Root Discoloration, Dead roots often with fungal growth, Fungal hyphae under bark**



Armillaria Root Rot



Pythium Poinsettia



Viral and Virus-Like

➔ Tulip Color Break Virus



Tomato Spotted Wilt Virus



Rose Mosaic Virus



Root Knot Nematode



Rose Rosette Disease



Abiotic Plant Disease (Not Transmissible)



Wind Dessication (Southwest Exposure)



Marginal Leaf Necrosis



Iron Chlorosis (Soil pH too High)



Hmmm....



Guess





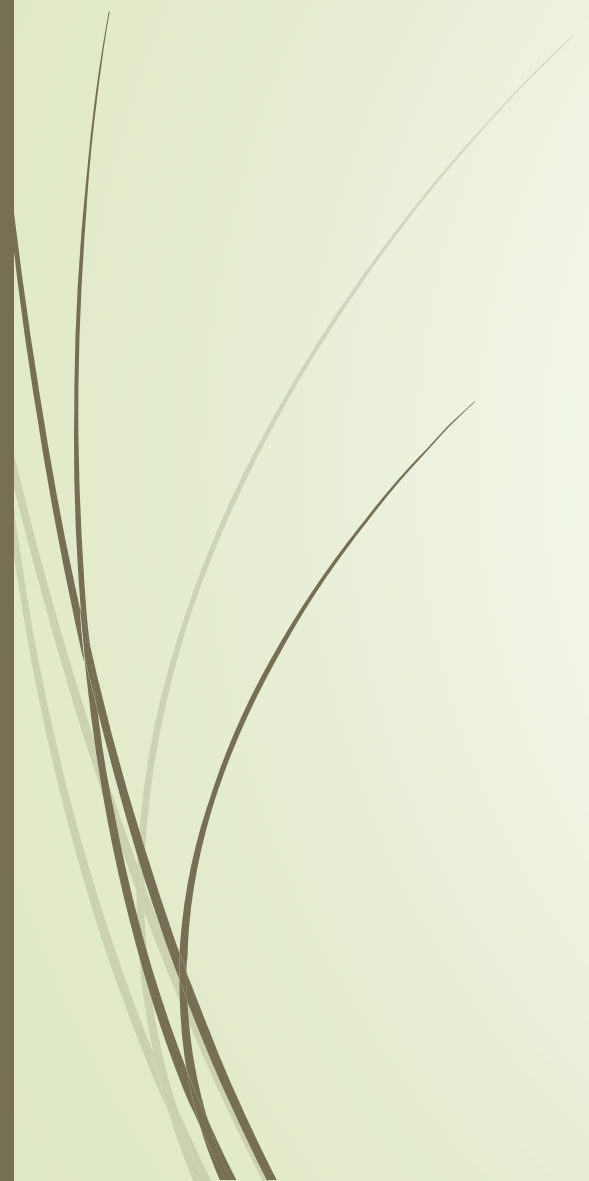
Dogma

- **Every Solution Causes a Problem**
- **Early Fall Early Decline**
- **The Too's.** Too Much.. Too Little.
 - Water, Wind, Sun, Nutrient, Oxygen
- **Fill Kills.....** (Oxygen, Oxygen, Oxygen) Soil Compaction
- **Cultural, Cultural, Cultural.....**



Hmmm....







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The End!

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