Management of Stem Rot

→ Minimizing wounds

Alternative

Wounds can be treated with - "scalent"

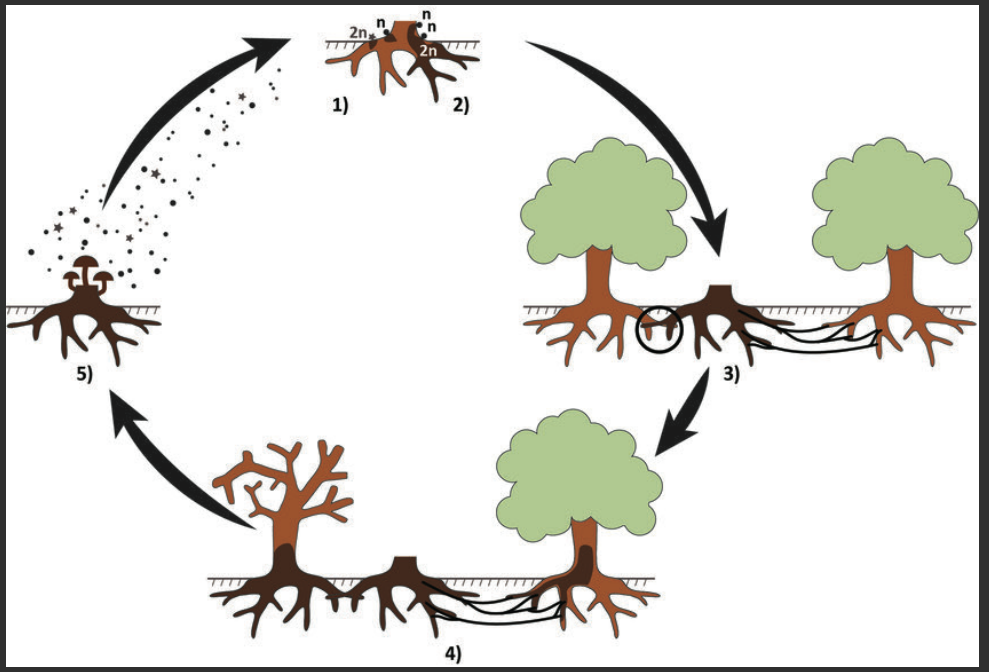
→ Pruning trees

- Deciduous trees
  - Prune/core trees in late winter/early spring
    - Carbon can be used to heal wound
- Coniferous trees
  - Pruning when dormant is best (cold winter days)

Stem Rot Rating System

Category	Description	Action
1	No conks present	No action
2	Solitary conks present	Little rot; tree removed as wood product
3	Several conks present	ROC; remove tree
4	Many conks with 25 ft present	Entire core is rotten

Root Rot and Butt Rot



1. Infect the root collar or roots via stump or wound at EC

2. Hyphae spread to adjacent trees via root - root or hyphae - root contact

3. White rot of roots, attack cambium and/or heart wood

Amaillaria

Honey mushroom

Aspen and many conifer as hosts

Sporocarp

Hyphae in bole

Wounds at root collar on living trees are common entry points →

Heterobasidion
Formally Annosum

8 species in Western US

- Pretty much any tree can be a host

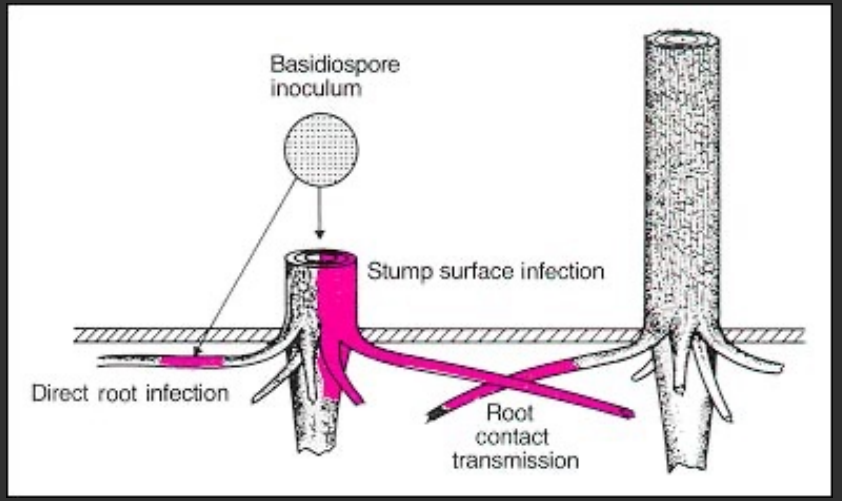
Ganoderma

Artists conk

- Common on Aspen and many conifers

Heterobasidium

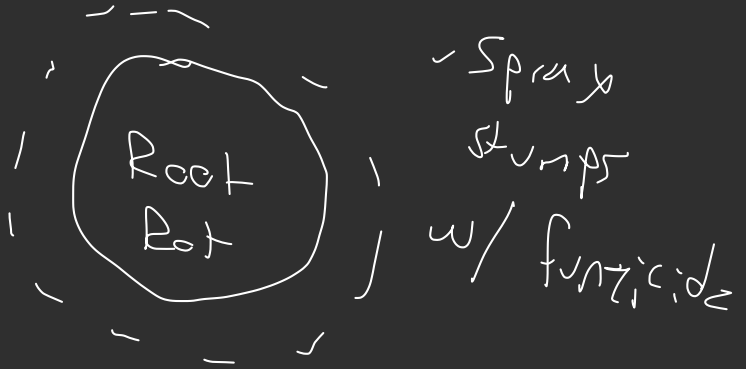
— Most imperant root rot in terms of commercial damage



Circular patches of mortality

Managing for Root Rot

→ Group selection around root rot infection and a buffer around it
- 60 - 80 feet



Pucciniales (Rusts)

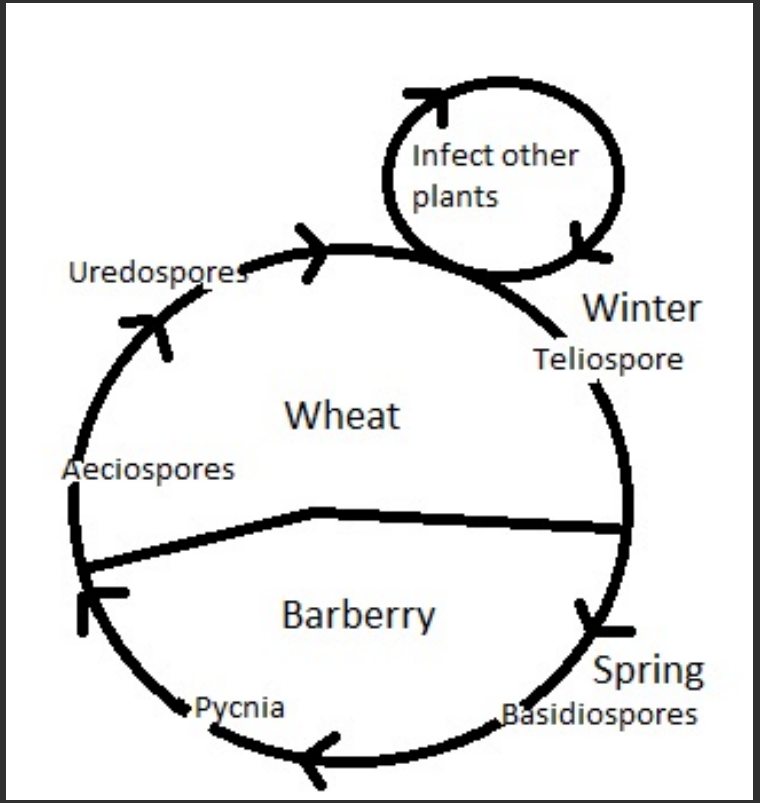
Mildew fungus w/ very complex life cycles.

Pucciniales (Rusts)

Life Cycle

→ Dependent on at least two host plants.

→ Different spores infect different plants.



Fir broom rust → Alternate host of caryophyllaceae

Melampsorella caryophyllacerum

And *Chrysomyxa arctostaphyli*

↳ Spruce broom rust

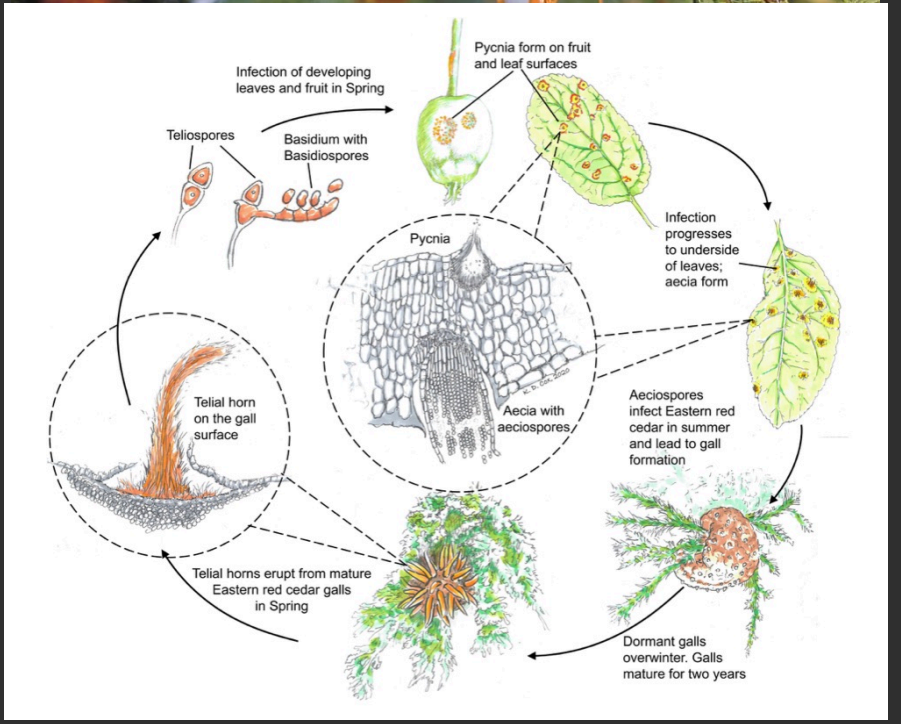
Broom rusts of firs and spruces.

Spruce broomrust → *Arctosphyllus*

Broom rusts cause witches brooms. which can degrade wood quality and change fire behavior

Gymnosporangium Rusts

Cedar - Apple Rust



Cedar – Apple Rust

damages fruits on Apples: causes little to no damage on Juniper

Management: Cut junipers in area near orchard.

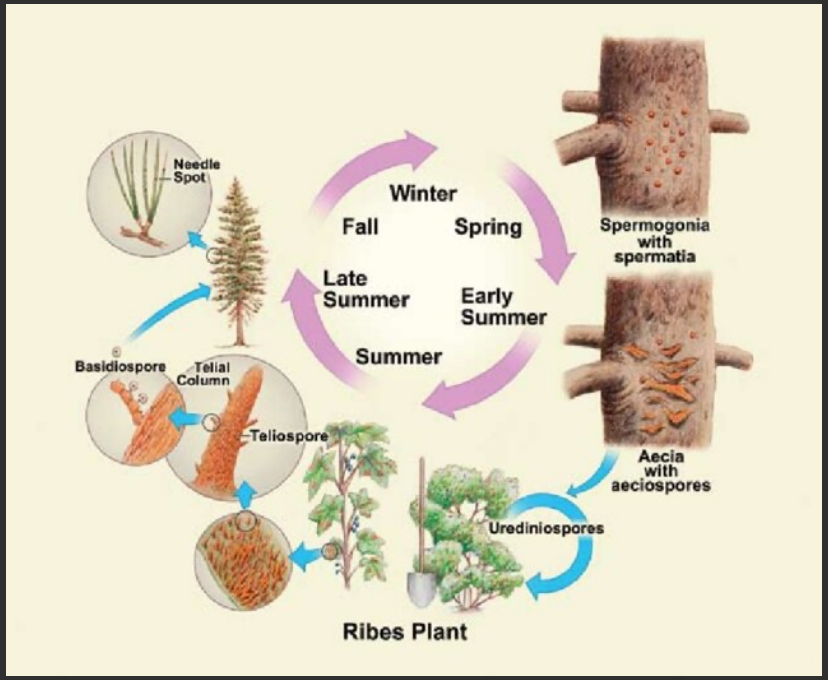
Cronartium ridicola

White Pine Blister Rust

- Introduced from Europe in 1900s.
- Hosts are 5needle pines
- Alternate host: Ribes

Because population growth occurs on Ribes. . .

Removal of ribes may slow spread within stands.



Causing up to 100% mortality of WBP in Northern Rockies

WBP is food for Clark's Nutcracker and Grizzly Bear

Swwp appears to have genetic resistance to WP3R