True fir needle cast (Lirula abietinus-concoloris)
Brooms caused by *Elytroderma deformans* on Pondera pine
Elytroderma deformans close-up of broom
Cross section through Perithecium of *Elytraderma*
**Rhabdocline sp** on Doug-fir

Photos from Sinclaire et al.
Diseases of tree and shrubs
Red band Needle blight *Mycosphaerella pini*

Showing typical infection pattern of a rain-splashed spore stage
Red band Needle blight *Mycosphaerella pini* dead Monterey pine and living Douglas-fir
Brown spot needle blight
*Mycosphaerella dearnessii*
Brown spot needle blight
*Mycosphaerella dearnessii*

Grass stage seedling

Bolting seedling after prescribed fire
Felt blight *Herpotrichia juniperi*

Photos from Sinclaire et al.
*Diseases of tree and shrubs*
Felt blight *Herpotrichia juniperi*
Anthracnose on Sycamore

*Apiognomononia veneta*

Photos from Sinclair et al. 1987
*Diseases of Forest Trees*
Photos from Sinclair et al. 1987 Diseases of Forest Trees
Photos from Sinclair et al. 1987 Diseases of Forest Trees

Cystothecia lanestris
Life cycle of white pine blister rust

- Plant resistant varieties of white pine.
- Eradicate Ribes spp.
- Remove infected branches.

**WHITE PINE**

Wind-borne basidiospores land on pine needle, germinate and enter through stomata (July to Sept.).

Basidiospores

In 4 to 10 weeks spots are visible on needles. Mycelium advances from needles to branches 12 to 18 months after infection. Pycnia form in the resulting canker and ooze sticky yellow-brown masses of pycniospores in July. 2 to 4 years after infection Aecia form the following spring.

Teliospores

Sterigma

Basidium

Basidia grow from the telial columns and release basidiospores.

Urediniospores may reinfect Ribes leaves with as many as 7 generations in one season.

Aeciospores infect leaves of Ribes (currants or gooseberries) through stomata on the underside.

Aeciospores form in chains.

The tree dies above the canker, often leaving live branches below.

The yellow aecial blisters lose color as spore discharge ends in summer.

Uredinia, the size of a pinhead, mature in 2 weeks on Ribes leaves.

Dead top

Living branches at base

Currants and Gooseberries
White pine blister rust on pine

Aecia

Spermatia
White pine blister rust on current leaves

Uredinia

Telia
On angiosperm leaves

1. Late summer & Fall
2. multiple fertilizations

3. Spring

4. Summer

5. karyogamy & meiosis

On Pine host

- 1
- 2
- 3
- 4
- 5
Western Gall Rust
*Peridermium harknessii*

No other host & no other spore stage
Stalactiform rust on lodgepole pine. (Aecial stage) alternates with *Castilleja* Indian paint brush
On angiosperm leaves

Late summer & Fall

karyogamy & meiosis

Summer

On Pine host

multiple fertilizations

Spring

1

2

3

4

5
*Coleosporium* sp. aecial stage on Pine needles
Telial stage on tar weed, golden rod.
Melampsora telia on underside of poplar leaf

Aecial stage, which is rarely seen occurs on needles of pinaceae (Larix).

Closeup 400X
Gymnosporanum telia on Juniper - aecial stage on Rosaceae
Broom rust of spruce (aecial stage)

Telial stage on *Arctostaphylos*
True fir Broom rust (Melampsorella) aecial stage
Telial stage on chickweed (Stellaria)
Uredinopsis on underside of Abies needle

Teliospores embedded in a fern leaf