Seed Orchard Pest Management

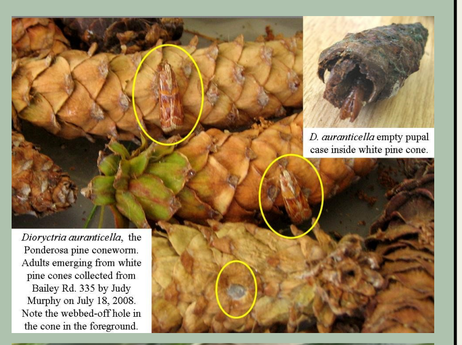
Pinus spp. (Lodgepole Pine (*P. contorta*), Western White Pine (*P. monticola*), and Ponderosa Pine (*P. ponderosa*)

	Dioryctria	EPSM	Pitch Moth	Leptoglossus	Needle Casts	Cydia piperana
Lodgepole Pine	Occasional	Common	Common	Common	Occasional	N/A
White Pine	Common	Rare	N/A	Common	Occasional	N/A
Ponderosa Pine	Occasional	Occasional	N/A	Common	Occasional	Common

Dioryctria spp.

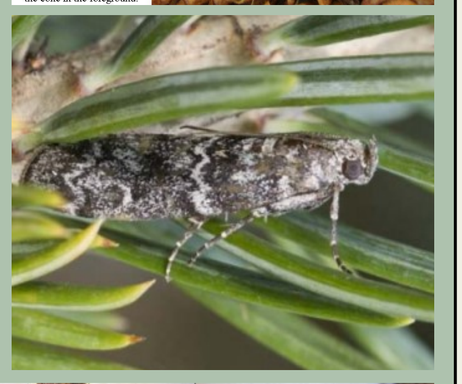
***D. abietivorella* and *D. auranticella* are both commonly found infesting Pine in BC orchards. Control methods are the same for both species**

- **Flights of Dioryctria can begin at around 250 GDD and occur throughout the spring, summer and early fall**
- **Damage begins to show up about 2 weeks after flight**
- **Traps recommended in Pw, but for Pli and Py visual surveys are the primary monitoring method**
- **Trap catch can be used in conjunction with visual damage surveys to time pesticide application.**



Dioryctria auranticella, the Ponderosa pine coneworm. Adults emerging from white pine cones collected from Bailey Rd. 335 by Judy Murphy on July 18, 2008. Note the webbed-off hole in the cone in the foreground.

D. auranticella empty pupal case inside white pine cone.



To Right: (Top) *D. auranticella* on White Pine (J. Corrigan), (Bottom) *D. abietivorella* adult (W. Strong).

Below: (Left): *Dioryctria* larvae overwintering on Pw, note frass accumulation in leftmost image (W. Strong); (Right) Py conelets attacked by *Dioryctria abietivorella* (J. Corrigan)

Conelets from one ramet in Bailey Rd. Py 346 attacked by *Dioryctria abietivorella*, Oct. 15, 2014.

Rhyaciona buollana

European Pine Shoot Moth

- **Damages shoot tips throughout the crown impacting crown management and causing loss of cones**
- **Young ramets may be killed by severe infestation**
- **Causes characteristic shepherd's crook in infested shoots**
- **Overwinters as early instar larvae that can be observed in visual survey during winter and early spring**
- **Pheromone traps provide reliable monitoring of flying adults**
- **Can be managed with spray targeting migrating larvae in late spring or flying adults in early summer**
- **Distribution in BC limited by winter temp.**

Clockwise from top left: Typical EPSM damage on Pli shoot tips; late instar EPSM larva and pupa; A hibernaculum on a shoot tip visible as window-like pitch and webbing; an adult EPSM; First instar EPSM on a Pli shoot. All photos, W. Strong

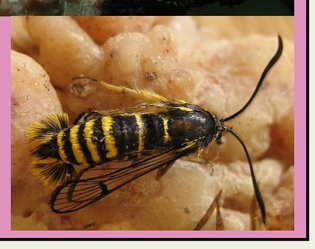
Synanthedon sequoiae

Sequoia Pitch Moth

- **Most serious on young ramets**
- **Can cause serious breakage or mortality**
- **Larvae burrow under bark and form large pitch masses and can girdle branches or even the main trunk of smaller trees**
- **Mechanical removal is primary means of control**
- **Chemical spray or Pheromone disruption may offer alternatives to manual removal, trials of these methods are in progress**

Above: Pitch Mass on Lodgepole Pine with larva visible (W. Strong);

Right: Adult male *Synanthedon sequoia* (J. Corrigan)



Needle Casts

Lophodermella concolor; Elytroderma deformans; Mycosphaerella pini -

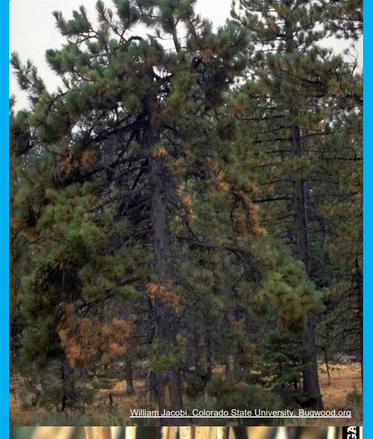
These are the most common species however other species not listed are also known to occur in BC

Pathogen	Infects	Crown Characteristics	Combination of Diagnostic Characteristics	Impact
Lophodermella concolor (Pine Needle Cast)	Current year's foliage (Pli, Py)	Red one year old needles on previous year's growth	• Wide central band becomes bleached over time • No black fruiting bodies visible from primary pathogen • Lion's tail appearance with repeated infections	Low to severe growth loss
Elytroderma deformans (Elytroderma needle cast)	Current year's foliage (Pli, Py)	Red one year old needles scattered throughout crown on previous year's growth	• Entire needle becomes red • Most needles of infected internode become red • Long black fruiting bodies (hysterothecia)	Growth loss; stem deformity to mortality
Mycosphaerella pini = Dothistroma septospora (Dothistroma blight)	All year's foliage (Pli, Py Pw)	Uniform red foliage in lower crown to mid-crown - "fire scorch" appearance	• Narrow red bands on green needles initially • Small black fruiting bodies restricted to red band • Epidermal flap over fruiting body • Occasional red pigmented bands on grey needles	Growth loss to mortality

Table courtesy of R. Reich, College of New Caledonia

Lophodermella concolor

Elytroderma deformans



Mycosphaerella pini

Leptoglossus occidentalis

Western Conifer Seed Bug

- **Visual surveys are most effective monitoring method and should be done in warmest part of the day when possible as they are more active during periods of higher temperature**
- **Chemical control through application of 'Matador' insecticide is very effective—Please follow all label guidelines for use**
- **Treatment of nymphs can prevent populations from establishing**
- ***Leptoglossus* feeding can have significant impact on first year White Pine cones and should be treated if high numbers are observed post-harvest**

Top image: Mating Leptoglossus adults on Pw (P. May); Middle Left: First instar nymphs with eggs; Middle Right: Third instar nymph; Bottom: Adult Leptoglossus, note 'W' shape on wings and enlarged hind limb (all other images W. Strong)

Cydia piperana

Ponderosa Pine Seedworm

- Eggs are laid in the spring
- Early-instar larvae move from bract into seeds to feed
- Larva moves seed-to-seed as it feeds leaving frass-filled seeds

Clockwise from top left; Ponderosa pine seeds with characteristic entrance hole; Early instar larva with brown head capsule and pale body; Larva overwintering in cone axil; Adults showing mottled wings with pupal casing reared; Seeds in infested cone, top seed is healthy, bottom is packed with frass after larval feeding (All photos from USDA FHS 18-06)