

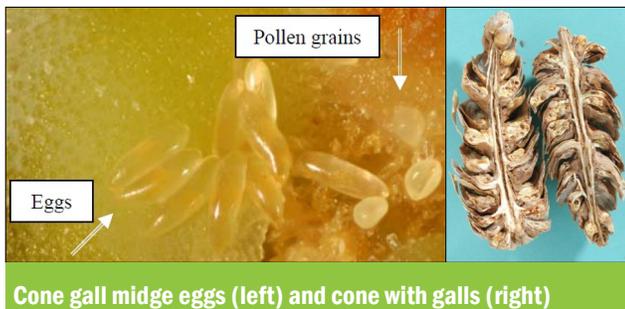


Conifer Cone Pests

Forest Health Fact Sheet

September 2017

Several types of insects infest cones or seeds themselves and lower the reproductive potential of conifers. Some of these include Douglas-fir cone gall midge (*Contarinia oregonensis*), coneworms (*Dioryctria* spp.), seed chalcid (*Megastigmus* spp.), western conifer seed bug (*Leptoglossus occidentalis*) and cone moth (*Barbara colfaxiana*). Evidence of these pests is sometimes indicated by the presence of crumbly frass spilling out of cones or tiny exit holes in seeds within cones. These insects are typically well-dispersed on the landscape and controlled by natural enemies and only pose a problem in seed orchard or tree farm settings. Management includes physical exclusion via bagging cones, sanitation of the site and pesticide application timed using monitoring traps.



D. Manastyrski

Cone gall midge eggs (left) and cone with galls (right)

Cone gall midge

The Douglas-fir cone gall midge is related to [Douglas-fir needle midges](#) but the cone gall midge attacks only seeds. It occurs in all west coast states. Eggs are laid on female conelets at the base of scales when cones are open for pollination (April-May). Eggs which are oblong may be confused with pollen grains which are more round. Orangish larvae emerge and form galls on the seed coat which destroys the seed. Damaged cone scales turn reddish brown toward the end of summer. In the fall when cones become wet, mature larvae drop to the ground, spin a cocoon and overwinter in leaf litter. Pupation occurs around February or early March. Adult flies are 3-4 mm long and have orange abdomens. There is one generation a year but they can remain dormant for a year or more until cone crops are suitable. Damage from this pest can prevent seeds from separating from scales and large pest populations can destroy all of the seeds in a cone.

Removal of infested, aborted cones from the ground may reduce populations and delay insecticide use. Eggs found on an average of ≥ 2.6 scales per cone sampled throughout the canopy may warrant control. Various

chemical sprays may be used to control adult midge populations if applied at the correct time (early spring before peak adult emergence, see USFS publication FHP -WSC-04-01). Use pheromone-baited traps to monitor for adult emergence using traps to correctly time sprays. Note that many other types of similar-looking, non-damaging flies may be collected in traps. Systemic injections can be used to target larval life stages.



Coneworm frass (left) and coneworm larva (right)

Buhl, ODF and D. Manastyrski

Coneworms

Caterpillars of coneworm moths bore into cones and sometimes also the cambium of trunks, branches or shoots. The fir coneworm (*Dioryctria abietivorella*) is particularly destructive and attacks various conifers, especially Douglas-fir and true firs. Buds, shoots and trunks may also be attacked. One larva can destroy an entire cone. Evidence of attacks can be identified from accumulation of coarse, reddish brown piles of frass on the outside of cones. On tree trunks attacks can induce sap production and superficially resemble attacks from [pitch moths](#) (*Synanthedon* spp.), which are primarily cosmetic pests. Females lay eggs in the summer on or near cones. Larvae are present on trees from spring to fall; late stage larvae drop to the ground to overwinter in

duff. Pupation occurs in the spring. 1 to 1½ overlapping generations a year are possible.

Destroying infested cones before September may reduce populations or delay insecticide use. Removing the duff layer in the fall may expose larvae to predation and cold temperatures. Use pheromone-baited traps to monitor emergence. Monitoring to detect the start of larval damage and evaluate damage rates should start 2 weeks after the first adult is found in traps. Chemical sprays may be applied in early June. Use pheromone-baited traps to monitor for adult emergence using traps to correctly time sprays.



Newly-emerged seed chalcid alongside exit hole

Seed chalcid

Several species of seed chalcid wasps occur in Oregon. They are host-specific and attack Douglas-fir, true firs, pines, spruce and hemlock. Adults are 2.5-6.5 mm long and ant-like. Females lay eggs in seeds of young, green cones. Larvae feed within seeds and damage is not apparent from the outside of the seed. Larvae mature and adults emerge the following spring (or 2-3 years later) leaving a small round exit hole. Although seed losses from this pest are not typically severe, at times they can cause a high percentage of seed loss.

Appropriately-timed chemical sprays may be used for control; use carrot rust fly sticky traps to monitor for adult emergence. Note that many other types of similar-looking, non-damaging wasps may be collected in traps.

More information:

Oregon Dept. of Forestry, Forest Health
<http://tinyurl.com/odf-foresthealth>
2600 State St. Bldg. D, Salem, OR 97310
503-945-7200

Other references:

USFS Forest Health Protection
www.fs.usda.gov/goto/fhp/fidls

OSU Forestry Extension
<http://extensionweb.forestry.oregonstate.edu/>

Management note

Pesticides registered for use on these pests can be found in the [Pesticide Center Online \(PICOL\)](#) database.

When using pesticides, always read and follow the label



Western conifer seed bug nymphs (left) and adult (right)

Seed bug

The western conifer seed bug is a type of leaf-footed bug that feeds on and damages seeds from Douglas-fir, pines and incense cedar. Adults are 1.5-2 cm long with distinctly flattened, leaf-like segments of hind legs. Overwintering adults emerge in May or June and lay eggs on needles. Nymphs emerge and feed on seed ovules which can cause conelets to abort. Late stage nymphs and adults suck juices from seeds from outside the cones. Feeding continues until the weather cools or seeds drop from cones. Damage is not detectable externally on cones but the insect itself can be seen. Heavy feeding can cause up to 40% seed loss in Douglas-fir.



Adults are < 1/3" long

Cone moth

Adults emerge in spring and lay eggs in the bracts of young, budding cones. The caterpillars of this insect mine through scales and seeds and their tunnels exude resin and larval castings. Caterpillars are cream-colored with black or brownish heads. Feeding is completed near the end of July. Pupae overwinter in papery, resin-coated cocoons near the cone axis. Pupae can remain dormant for 1-3 years in fallen cones, if cone crops are poor. Severely damaged cones may be smaller and/or distorted and have evidence of fine frass on the outside. One larva within a cone has the ability to destroy 65% of the seed, two larvae can destroy 100%.