A3288

Spruce gall adelgids

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Tiny aphid-like insects frequently cause unusual swellings called galls at or near the ends of spruce branches. The insects, technically known as adelgids, are often called spruce gall aphids. Their feeding causes galls to form.

Two insect species are involved, the Cooley spruce gall adelgid, *Adelges cooleyi*, and the eastern spruce gall adelgid, *Adelges abietis*. Between them they can attack almost all spruce species. White, Colorado blue, Sitca, and Engelmann spruce are the primary hosts of Cooley spruce gall adelgids. Douglas fir is an alternate host for this insect. Eastern spruce gall adelgids attack mainly Norway and white spruce, and occasionally other spruces.

Symptoms and effects

Cooley spruce gall adelgids cause galls to form at spruce stem tips. Fully developed galls are 1–3 inches long and ½–¾ inch in diameter. When galls start forming in early spring they are green or purple. Galls form completely by midsummer, then turn brown and dry. Needles attached to galls also turn brown and die.

Cooley spruce gall adelgid infestations kill spruce terminals, causing side branching. Dead galls persist on trees, leaving them less attractive. Persistent heavy infestations on young trees can slow tree growth.

Cooley spruce gall adelgids attack Douglas fir during mid- and late summer. Galls do not form on Douglas fir. Instead, the small, white, wax-covered insect feeds on needles, causing yellowish spots and bent or distorted needles. Only large populations significantly damage Douglas fir.

Galls caused by eastern spruce gall adelgids resemble small pineapples, up to 1½ inches long. Eastern spruce gall adelgids do not kill stems; tip growth continues. Therefore, galls usually occur at the base of the current year's growth, rather than at the tip.

Life cycles

Eastern spruce gall adelgids overwinter as nymphs (immature stage) under waxy threads at the base of buds. Nymphs mature in early spring. Adult females each lay about 50 greenish eggs. Eggs hatch in about 2 weeks and young nymphs crawl to the bases of expanding buds where they feed. During feeding, the insects inject a toxic saliva into the plant inducing gall formation, which is abnormal bud development. As the plant tip grows, the gall encloses the adelgids, protecting them from adverse weather, chemical sprays,

Cooley spruce gall adelgids on Douglas fir.

Cooley spruce gall adelgids on spruce.

Eastern spruce gall. The shoot continues to grow from the gall. Cavities along the edge of the cross-section contain the adelgids.

predators and parasites. In late August small openings form in the drying gall and the adelgids emerge as full-grown nymphs. Within 2 days, they transform into winged adults and may migrate to other spruces. Each female then lays 20–60 eggs before dying. Eggs hatch in about 16 days and nymphs immediately crawl to overwintering sites.

The Cooley spruce gall adelgid's life cycle is more complex. In the typical life cycle, immature females overwinter on spruce. In early spring each female matures and lays several hundred eggs on the tips of side branches. The eggs hatch in about 10 days and nymphs migrate to new spring growth where they feed at the bases of developing needles. Their feeding induces galls that eventually envelop the insects. In midsummer, an opening develops at the base of each needle on the gall and the adelgids inside migrate to needle tips and transform into winged adult females. Females that migrate to Douglas fir lay eggs on needles, where one or more generations of adelgids feed. Eventually, winged forms migrate back to spruce trees. Douglas fir is not a required alternate host, and often infestations continue on spruce.

Control options

Light infestations of spruce gall adelgids do not injure healthy, established trees. On small trees, light infestations may be controlled by pruning-out galls. Heavy infestations on small trees are unsightly and can disfigure or stunt the growth of a tree.

Galls protect spruce gall adelgids from biological and chemical control agents during much of their lives. Thus, correct timing is essential for effective control.

The most evident damage from spruce gall adelgids occurs in the spring. As a result, the most effective control treatments are directed towards the overwintering stage before they lay eggs.

Cultural control

The best time to remove and destroy galls is in spring when they are moist, green, and growing. This reduces needle damage and decreases the chances for reinfestations the following year.

Resistant or tolerant varieties of Douglas fir are available. Typically, Douglas firs with green needles are more resistant than those with blue-green needles. If possible, avoid planting Douglas firs and Colorado spruces near each other.

Chemical control

Insecticides can be applied in the spring, summer, or fall; each period has its strengths and limitations.

For best results, make sure insecticides thoroughly cover needles. Mist blowers are generally effective. Refer to Extension publication *Woody Ornamentals Pest Management in Wisconsin* (A3597) for current chemical recommendations. Treatment of large trees may require the professional equipment of a commercial arborist.

Spring treatments. Treat trees in early spring before adelgids mature and lay eggs. This is typically as buds break. Because of temperature irregularities in spring, monitor bud development closely.

Summer treatments. Spraying trees during the growing season controls active adelgids. However, these sprays will not control the migrating insects that arrive in the fall, nor will they prevent spring needle damage.

Fall treatments. Sprays applied in late September through October will control the overwintering adelgids that cause needle damage in the spring. Be sure to thoroughly spray inner branches where most adelgids attach for the winter.

References to products in this publication are for your convenience and are not an endorsement of one product over other similar products. You are responsible for using chemicals according to the manufacturer's current label directions. Follow directions exactly to protect the environment and people from chemical exposure.

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