

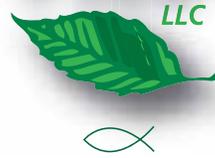
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Spruce Galls

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Tiny aphid-like insects called adelgids are the cause of unusual swellings (galls) that form at the ends of spruce branches. The galls they make are the result of enzymes released when these insects feed on the plant tissues. Two insect species are involved: the Cooley spruce gall adelgid and the Eastern spruce gall adelgid. Between them, almost all species of spruce trees may be attacked.

Symptoms and Effects

Spruce galls are easy to spot. They are abnormal growths near the ends of branches, and range in color from green to reddish purple in the spring and turn brown during the summer. Galls resemble small pineapples and are usually one to three inches long and about 1/2 to 3/4 inch wide.

Cooley spruce gall adelgid infestations kill the ends (terminals) of spruce twigs, this distorts normal growth patterns. Dead galls persist on trees, leaving them less attractive. Persistent heavy infestations on young trees can disfigure and slow tree growth.

Eastern spruce gall adelgids usually occur at the base of the current year's growth rather than at the tip. Persistent heavy infestations on young trees can disfigure and slow tree growth.

Life Cycles

The Cooley spruce gall adelgid's life cycle is more complex than that of the Eastern spruce gall adelgid. Immature females overwinter on spruce. In early spring each female matures and lays several hundred eggs on terminals. The eggs hatch and nymphs migrate to new spring growth where they feed at the base of developing needles. Their feeding induces galls that eventually envelop the insect. These galls prevent further growth of the tip. In midsummer, the

galls begin to dry out. An opening develops at the base of each needle on the gall allowing the adelgids to migrate to the needle tips where they transform into winged adult females. Some females migrate to Douglas fir and lay eggs on the needles, where one or more generations of insects feed. Eventually winged adults migrate back to spruce trees. Douglas fir is not a required alternate host, and often infestations revolve only around spruce. Galls do not form on Douglas fir, but the adelgids' feeding causes the needles to yellow and bend. Adelgids on Douglas fir have waxy white threads on their bodies, giving them a 'woolly' appearance.

Eastern spruce gall adelgids overwinter as nymphs (immature insects) under waxy threads at the base of buds. Nymphs mature in early spring. Adult females lay about 50 greenish eggs. Eggs hatch in about two weeks and young nymphs crawl to the bases of expanding buds where they feed. As the branch tip continues to grow, the new gall encloses the adelgids, protecting them from adverse weather, chemical sprays, predators and parasites. In late August small openings form in the drying gall and the adelgids emerge as fully-grown nymphs. Within two days, they transform into winged adults and may migrate to other spruce trees. Each female lays between 20-60 eggs before dying. Eggs hatch in about 16 days and nymphs immediately crawl to overwintering sites.

Spruce Gall Midge

The Spruce gall midge causes galls that may be confused with those of Eastern spruce gall adelgids. Eggs are laid at the base of newly developing needles in late May. Plant tissue grows around the young larvae and in a short time completely encloses them. Needles drop from the gall tissue. If galls completely surround

the shoot, the terminal portion ceases to grow and dies.

Control Strategies

Light infestations of spruce gall adelgids do not injure healthy established trees. On small trees, control light infestations by hand-picking the galls as they form. Heavy infestations are ugly and can disfigure a tree or stunt its growth. Galls protect the spruce gall adelgids from biological and chemical control during most of their lives. Therefore correct timing of control applications is extremely important.

Physical Control

While galls are still moist, green and growing, removal and destruction kills the adelgids within. This both reduces damage and decreases the chances for re-infestation the following year. Remove galls in spring or early summer using a pruning shears or a sharp knife to avoid injuring the twig. After the small emergence holes form the adelgids escape and gall removal after that will not control the insects. Pruning at this time only improves the tree's appearance.

Chemical Control

Acephate (Orthene) or diazinon can be used to control adelgids just before galls form. Although carbaryl (Sevin) is effective, use it infrequently because it may cause outbreaks of spider mites. Apply insecticides at the time of

bud break. Application after shoot elongation may not be effective because once galls form they protect adelgids from sprays.

To control heavy infestations two insecticide applications may be necessary, one at bud break and one in late summer/early fall to control the overwintering insects.

Because the timing of spray applications is essential to control and the window of opportunity is small, a good alternative to sprays is the use of a soil applied systemic insecticide like Merit (imidacloprid). Merit is taken up by the roots and distributed throughout the tree. The insects are controlled as they start to feed, limiting the damage. Merit can be applied at anytime during the growing season, however it takes time to be distributed in the tree so early spring or early fall (for control the following year) are the best times to apply Merit for more complete control. Merit is also a good choice for trees that are difficult to spray because of their location or size.

Generally, it is unnecessary to control spruce gall adelgids on Douglas fir unless populations are high and causing excessive needle damage. Treat Douglas fir with a material listed above when the adelgids are present.

When performing chemical applications, always read, understand and follow the product manufacturer's instructions and rates.

After assessing your site and plant health your Sherdec Arborist can make specific recommendations regarding care and treatment for your important landscape plants.



Spruce Gall Midge Damage