OC0328

Michigan State University Extension-Oakland County

Spruce Gall Adelgids

Eastern Spruce Gall Adelgid

Hosts: Norway, red, white, black Hills, and black spruce.

Importance: The nymphs of this species cause swellings or galls to form at the base of young shoots. The galled shoots become brown, stunted and deformed, making the tree unfit for sale. A single tree may have hundreds of galls and can be repeatedly attacked.

Look For: Pineapple-shaped green or brown galls, ¾ to 1 inch long, at the bases of new shoots.

Biology: Females overwinter near end buds and lay eggs at bud bases in spring when buds begin to break. Nymphs hatch and feed in clusters on new needles, which collectively swell into the characteristic gall. The gall opens between mid August and October, allowing the adults to emerge, disperse, and reproduce.

Monitoring and Control: Look for brown galls on trees of all ages in mid to late summer. If galls are too numerous to hand clip, treat infested trees this fall or the next spring.

- Clip off and destroy green galls before they turn red and open in late July
- Cut and destroy severely injured trees.
- Spray infested trees with a registered insecticide in early April just before the buds begin to swell, or mid to late September after galls have opened.
- Keep trees vigorous to avoid infestation.

Cooley Spruce Gall Adelgid

Hosts: Colorado blue and occasionally other spruce species; Douglas-fir.

Importance: The nymphs of this species cause long curved persistent galls to form on the new shoot tips of blue spruce. These attacks may kill shoots, deform the tree, and lower its value as a Christmas tree. On Douglas-fir, nymph feeding discolors and distorts needles, but does not produce galls.

Look for (on spruce):

- Galls: cone-like, green, purple, or brown swellings, 2 to 2 ½ inch long, on the tips of new shoots.

Look for (on Douglas-fir):

- Yellow spots on bent or curled needles, caused by nymph feeding.
- Small cottony balls dotting the undersides of needles.

Biology: On spruce, young females lay eggs in the spring under a mass of white, cottony wax near the terminal (end) bud. Nymphs hatch and feed at the needle bases of expanding buds, producing galls that enclose and protect them. After galls dry up in midsummer, the exposed nymphs will either continue their life cycles on blue spruce or fly to Douglas-fir where they do not cause galls to form. The nymphs overwinter, and the next spring the winged forms may fly back to spruce, where they reproduce gall-forming adelgids and thus complete the life cycle. These adelgids can complete their life cycle on 1 or 2 hosts; however, injury tends to be more serious when they move between two hosts.

Monitoring and Control:
On blue spruce: Look for brown galls on trees of all ages in August. If galls are few and scattered, remove by hand. If galls are too numerous to hand clip, treat entire plantation this fall or the next spring.

- Clip off and destroy green scattered galls before they turn red and open in July.
- Cut and chip or burn heavily affected trees.
- If needed, spray trees with a registered insecticide just before spruce buds break in late April or early May.
- Or, apply a dormant oil in early spring or late fall when trees are dormant.

On Douglas-fir: Monitor trees of all ages throughout the growing season. If you find small cottony balls on the undersides of needles, treat entire plantation.

- To control overwintering aphids, apply a registered insecticide to trees in early October of just before Douglas-fir buds break in April or early May. Spray trees when the temperature is above 60 degrees F.
- An application in late June to mid July may be needed to control later stages.
- Or, apply dormant oil in early spring or late fall when the trees are dormant.

Disorder: Spruce Gall Adelgids

Spruce (Picea)

Tiny aphid –like insects frequently cause unusual swellings called galls at or near the end of spruce branches. The insects, technically known as adelgids, are often called spruce gall aphids. Their feeding causes galls to form. Spruce galls, green to reddish purple when they form in spring, turn brown during summer.

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 occur mainly on Norway and white spruce, and occasionally on 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 ½-3/4 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 on 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 1 ½ 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 insect 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, 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 hand 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 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

Light infestations of spruce gall adelgids do not injure healthy, established trees. On small trees, control light infestations by pruning out galls. Heavy infestations on small trees are ugly and can disfigure a tree or stunt its growth.

Galls protect spruce gall adelgids from biological and chemical control agents during much of their lives. Therefore, correctly timing control measures is extremely important. Do not fertilize infested trees.

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. Use a pruning shears or sharp knife to avoid injuring the twig. After the small emergence holes form, the adelgids have already escaped and gall removal will not control adelgids. Pruning at this time only improves the tree's appearance.

CHEMICAL CONTROL

Use lime sulfur or dormant oils before bud break. Such applications kill overwintering stages unprotected by galls. (Note: Lime sulfur discolors brick work and painted surfaces; do not use it near buildings. Spray oils reduce the blue color of Colorado blue spruce.)

To control adelgids just before galls form you can use labeled insecticides.

Except for dormant sprays, apply insecticides as buds break. Application after bud break may not be effective, because once galls start to form, they protect adelgids from sprays. Because of temperature irregularities in spring, monitor bud development closely.

You may need two insecticide applications to control heavy infestations. One program includes a dormant spray of lime sulfur or dormant oil, and a second application of one of the bud-break insecticides. A second two-spray program includes two applications of one of the bud-break materials about 5 days before and 5 days after bud break.

Control populations of Cooley spruce gall adelgid on Douglas fir only if adelgid populations are large enough to make the tree unsightly or to cause a nuisance.

Treatment of large trees may require the professional equipment of a commercial arborists.

Remember that the proper amount of insecticide to use varies with chemical, formulation and manufacturer. Read the

insecticide label carefully for specific information on controlling spruce gall adelgids. Some labels may refer to adelgids as spruce gall aphids.

-References to pesticide products in this publication are for your convenience and are not an endorsement of one product over the similar products. You are responsible for using pesticides according to the manufacturer's current label directions. Follow directions exactly to protect the environment and people form pesticide exposure. Failure to do so violates the law.

C.f. Koval and Phillip J. Pellitteri

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