PennState Extension

Eastern Spruce Gall Adelgids

The eastern spruce gall adelgid overwinters as an immature female called a stem mother. Damage includes shoot and branch injury.

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Adelgid nymphs maturing inside a protective gall. Courtesy of Sandy Gardosik, PDA

***Adelges abietis* (Linnaeus)**

Hosts

- Norway spruce (*Picea abies*)
- White spruce (*P. glauca*)

Damage Potential

- Moderate

Symptoms and Signs

Before and at Bud Break

- Stem mothers and small masses of eggs covered with white, woolly wax

Throughout the Year

- Green- or brown-colored galls at the base of new shoots; growth beyond gall may be dead or stunted

Causes of Similar Symptoms

- Cooley spruce gall adelgid (galls will be found at tips of new growth)

Identification

This insect is difficult to find but can easily be identified by the gall it forms. In spring as the new growth elongates, galls resembling small pineapples, ½ –1 inch (1.0–2.5 cm) long, are formed at the base of the new growth—in contrast to Cooley spruce galls, which form at the end of the new shoot. New growth will continue beyond the gall, somewhat obscuring the gall from view. Initially, galls are green, but they turn brown and open in late summer, releasing the nymphs. Both previous and current-year galls may be visible on trees. The galls may cause stunting and death of shoots, resulting in disfigurement of the branches and tree, but they rarely kill the tree.

Overwintering immature females can be found from fall through early spring at the base of the terminal and lateral buds and in bark crevices of twigs. They are dark and may have a faint ring of white, waxy material surrounding their bodies. As bud break approaches, they will increase the waxy material before depositing eggs. A 15X hand lens is required to locate overwintering eastern spruce gall adelgids.

Biology and Life Cycle

The eastern spruce gall adelgid overwinters as an immature female called a stem mother (Figure 1). As bud break approaches, the stem mother matures and secretes white, woolly wax around her body (Figure 2). She deposits 100–200 greenish-brown eggs in this mass (Figure 3).

Figure 1. Overwintering immature females (stem mothers). Courtesy of Rayanne D. Lehman, PDA

Figure 2. Female secreting waxy filaments to cover her body. Courtesy of PDA

Figure 3. Eggs under white, woolly wax made by the stem mother. Courtesy of Sandy Gardosik, PDA

At bud break the eggs hatch into yellowish-colored nymphs, which move to the new growth and begin feeding. This feeding causes abnormal twig growth, which results in gall formation (Figures 4 and 5).

Figure 4. Purplish growth indicating the start of a gall on new growth. Courtesy of Tracey Olson, PDA

Figure 5. Gall of eastern spruce gall adelgid. Courtesy of Minnesota Department of Natural Resources Archive, Bugwood.org (#4212052)

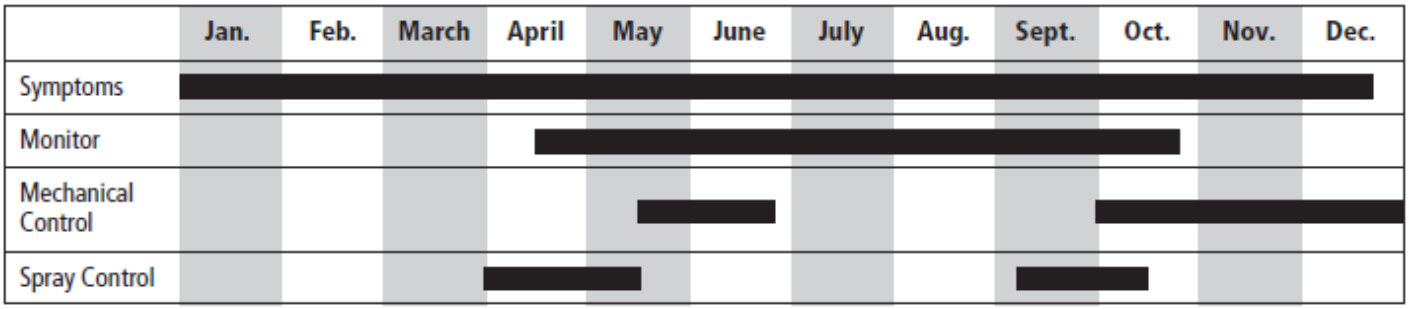
The adelgids remain safe in the gall until August/September when the gall turns brown and opens to release mature nymphs (Figures 6 and 7). These nymphs mature to winged, egg-laying females; there are no males. These females generally remain on the same tree, depositing their eggs near the tips of needles. These second-generation eggs result in immature females, which will overwinter near buds (Figure 8).

Figure 6. Browned gall after release of adelgids. Courtesy of E. Bradford Walker, Vermont Department of Forests, Parks, and Recreation, Bugwood.org (#0907022)

Figure 7. Gall damage on Norway spruce. Courtesy of Pennsylvania DCNR Forestry Archive, Bugwood.org (#5018059)

Figure 8. Overwintering females around buds. Courtesy of Rayanne D. Lehman, PDA

Calendar of Activities



Monitoring and Management Strategies

Plantation Establishment

- Plant tree varieties that are resistant to or are not hosts of eastern spruce gall adelgid.
- Remove and destroy heavily infested trees within and surrounding the plantation.

Preseason

- Scout for brown galls on trees from the previous year's infestation; monitor these trees closely for exposed stem mothers (before covered with waxy filaments).
- Before buds double in size and bud scales loosen, apply a dormant oil or spring insecticide to manage overwintering females.

— Only apply oil when temperatures are above freezing.
— Oil will remove “bloom," or blue color, from blue specimens.

- Around bud break time, scout for white, woolly egg masses near the buds.

Growing Season

- Threshold level: At this time, no determined threshold number exists for the eastern spruce gall adelgid.
- Growing degree days: Recommended control against nymphs should occur in spring, before nymphs wax over, at 22–170 GDDs and in fall at 2,800–3,000 GDDs
- Scout for green galls; remove and destroy them whenever possible before they turn brown and open in late summer.
- At the end of the season, evaluate results and update records.

Control Options

Biological

- No recommendations are available at this time.

Mechanical

- Remove green galls before they open in late summer.

Biorational

- Apply dormant oil in spring to manage overwintering females (only when temperatures are above freezing).

Chemical

- Apply a fall insecticide or dormant oil from mid-September to October to manage overwintering stages.

Next Crop/Prevention

- Only plant pest-free trees from a reputable source.