Horticulture Diagnostic Laboratory

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Spruce Gall Adelgids

Adelges abietis (L.), *Adelges cooleyi* (Gill.)

Fig. 1. New galls formed by eastern spruce gall adelgids. *Note the purple or red curved markings and the remains of the white woolly egg sac.* (E. Bradford Walker, Vermont Department of Forests, Parks and Recreation, www.Bugwood.org)

Fig. 2. A new gall formed by the Coolley spruce gall adelgid. (Christmas Tree IPM, Department of Plant Pathology, Cornell University)

Most spruce trees are damaged by one of two species of gall forming adelgids; the eastern spruce gall adelgid (*A. abietis*) and the Cooley spruce gall adelgid (*A. cooleyi*). These soft-bodied insects feed by sucking plant juices. They are small and not readily seen, but their feeding on young plant tissue causes the formation of obvious cone-like growths called galls, which stunt and eventually kill the twigs. These insects are not usually a serious pest under forest conditions as they injure only a small proportion of the foliage. At times they disfigure ornamentals, and continued infestations may weaken trees and make them susceptible to attack by other insect pests and disease producing organisms.

The eastern spruce gall adelgid, a native of Europe, is widely distributed in the northeastern United States. This is the primary pest of Norway spruce.

The Cooley spruce gall adelgid is indigenous to North America. This adelgid usually affects Colorado blue, Sitka, Englemann, and Oriental spruces.

Damage: Feeding by the adelgids produces a characteristic cone-like gall. The galls shape, size, and position on the twig aid in identifying the species involved.

Galls interfere with the natural formation of twigs and cause curling, stunting and the eventual death of new growth. Heavy infestations give the trees a ragged appearance and destroy their beauty. Some trees have a natural resistance or immunity to these adelgids, and in spite of the presence of the insects, the galls never completely develop or may not form at all.

Description: Eastern spruce gall adelgids produce pineapple-shaped growths 1/2 to 1 inch long, which are usually found near the base of the current years twig. New galls, formed in early summer, are green with purple or reddish, curved markings (**Fig. 1.**) Old galls are reddish-brown and have several small, open cavities. Terminal buds are not destroyed until the entire twig dies.

Cooley spruce gall adelgids form a larger gall, 1 to 3 inches long, which usually covers the entire tip of infested new growth (**Fig. 2.**) Terminal buds are injured quickly. These adelgids frequently migrate to Douglas fir, an alternate host, but do not produce galls on this tree. Severe adelgid feeding on Douglas fir may cause yellowing and crooking of needles (**Fig. 3.**) and partial needle fall, but normally, little disfiguration (real damage) to the tree results.

Fig. 3. Needle damage to Douglas fir from Coolley spruce gall adelgid. *Note the yellowing and crooking of the needles*. (Christmas Tree IPM, Department of Plant Pathology, Cornell University)

Fig. 4. Characteristic white cottony wax produced by female Coolley spruce gall adelgids on Douglas fir. (Whitney Cranshaw, Colorado State University, www.Bugwood.org)

Life Cycle: Only females of the eastern spruce gall adelgid are known. The immature stage called nymphs, winter beneath a thread-like cover of waxy material, usually near the base of a terminal bud. The nymphs begin feeding in early spring and, when mature, lay eggs on the bases of expanding buds and feed on developing needles. Continued feeding induces abnormal growth of plant cells and progressive enlargement of the bases of infected needles. Eventually the enlarging needles coalesce and form the characteristic pineapple-shaped gall within which the insect lives and grows.

Galls and adelgids mature in mid-summer. The gall dries and splits around the deformed needle bases and the adelgids emerge.

These young females shed their skins, develop wings and fly to the needles of the same or another spruce tree, where they lay eggs once again at the bases of new buds.

Immature females of the Cooley spruce gall adelgid winter beneath bark scales on spruce or Douglas fir and produce a waxy covering in the spring (**Fig. 4.**) The egg masses are laid under this conspicuous covering, which resembles a small cottony mass. Following egg hatch, the nymphs crawl to the developing buds and begin to feed at the base of the new needles, eventually forming a gall. The gall opens during middle to late summer (**Fig. 5.**) and the mature adelgids emerge. Some females may migrate to Douglas fir to lay their eggs. The eggs hatch and the young insects winter there. In the spring, they feed on the needles, mature and lay eggs. The eggs hatch and the adults which eventually develop may remain on the fir to fly back to spruce to lay eggs for a new generation. The presence of Douglas fir is not necessary, however, as the adelgids can maintain themselves on spruce alone.

Management

Cooley Spruce Gall Adelgid (on Spruce): Apply horticultural oil as a dormant spray in mid- to late April (22–91 GDD) just before buds begin to break. In mid-September (1850–1950 GDD), apply carbaryl, horticultural oil, or insecticidal soap. *Horticultural oils may discolor the foliage of Blue spruce.*

Cooley Spruce Gall Adelgid (on Douglas Fir): Do not plant Douglas-fir near blue spruce as the adelgid uses both as hosts. Damage is rarely serious. If needed, treat in early May (120–190 GDD) and again in early August (1500–1775 GDD). Use carbaryl, horticultural oil, insecticidal soap (potassium salts of fatty acids), or lambda-cyhalothrin.

Eastern Spruce Gall Adelgid (on Spruce): This adelgid makes galls at the base of new shoots on Norway spruce. Spray in mid-April to early May (22–170 GDD) or treat in mid- to late September when insects emerge from galls and majority of galls are open. Use horticultural oil or insecticidal soap.

For information on utilizing GDD contact Cornell Cooperative Extension – Suffolk County or visit the CCE web site http://ccesuffolk.org/assets/Horticulture-Leaflets/Using-Growing-Degree-Days-for-Insect-Pest-Management.pdf

Resource: Dr. Howard C. Miller in cooperation with Dr. Douglas C. Allen, Department of Environmental and Forest Biology, SUNY @ Syracuse, Syracuse, New York, Cornell Tree Pest Leaflet A- 12, 1980.

Fig. 5. Galls of Coolley spruce gall adelgid drying and splitting open in mid- to late summer. (Whitney Cranshaw, Colorado State University, www.Bugwood.org)

Pesticide and management recommendations obtained from*: Part I Guide to Pest Management Around the Home, Cultural Methods* and *Part II -- Pest Management Around the Home, 2009 -2010 Pesticide Guidelines*, Contact Cornell Cooperative Extension – Suffolk County for information on how to order a copy.

The Pesticide Management Education Program (PMEP), in cooperation with the New York State Department of Environmental Conservation (NYSDEC), maintains a web site with a searchable database for pesticide products currently registered in New York State. Individuals who have Internet access can locate currently registered products containing the active ingredients suggested above at http://pims.psur.cornell.edu/index.php (NYS PIMS).

This publication contains pesticide recommendations. Changes in pesticide regulations occur constantly, and human errors are still possible. Some materials mentioned may no longer be available, and some uses may no longer be legal. All pesticides distributed, sold, or applied in New York State must be registered with the New York State Department of Environmental Conservation (DEC). Questions concerning the legality and/or registration status for pesticide use in New York State should be directed to the appropriate Cornell Cooperative Extension Specialist or your regional DEC office. Read the label before applying any pesticide.

TK: 1/2010 AW 3/2012