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Cankerworms

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What You Should Know

• Both spring and fall cankerworms occur sporadically in Utah, typically on a five to seven year cycle.

• Larvae feed for six weeks in the spring and cause heavy defoliation in outbreak years.

• Treatment is often not warranted for most years; however, using *Bacillus thuringiensis* or spinosad before larvae exceed 1/2 inch is an effective control option.

Cankerworms, also known as inchworms, are in the order Lepidoptera and family Geometridae. Geometrid moth adults have slender bodies and relatively large, broad forewings (Figs. 1, 3). Both fall, *Alsophila pometaria*, and spring, *Paleacrita vernata*, cankerworms occur in Utah, with the fall cankerworm being most common. Insect outbreaks are periodic and concentrated in urban areas or near deciduous woodlands, and can cause complete defoliation of trees in early spring. Both cankerworm species are native to deciduous forests of North America, and have many natural enemies that regulate outbreak populations. Typically, the cankerworm population will increase to an upper limit where it will remain for 2 to 3 years, and then decline for the same duration. There are no historical records of outbreaks in Utah, but according to interviews, feeding during the summer of 2007 was more severe than in the past 15 years.

Fig. 1. Spring cankerworm adult.[1]

Fig. 2. Fall cankerworm feeding damage.[2]

Hosts and Life Cycle

Fall and spring cankerworm larvae feed on a wide variety of hardwood tree foliage including apple, ash, red and white oaks, maple (including boxelder), elm, cherry, linden, and honeylocust (Fig. 2).

Cankerworms have one generation per year. Eggs hatch in early spring soon after bud break (about 148-290 degree days after January 1, at 50˚F lower developmental threshold). As trees become defoliated or too crowded, larvae drop on silken threads and are blown to adjacent or understory trees to continue feeding. Heavy winds can carry them several hundred yards. After approximately six weeks of feeding (mid June in northern Utah), 5th instars drop to the ground and pupate in the soil. During outbreaks, larvae can be a nuisance as they land on people, cars, picnic tables, and roads, but rarely for extended periods.

Fall cankerworm moths emerge during warm periods in the fall, after the first hard freeze (October in southern Utah and November in northern Utah) over a period of four weeks. After mating, females lay approximately 100 eggs in neat rows on bark and twig terminals.

Spring cankerworm moths emerge during warm periods in late winter (mid February in southern Utah and mid March in northern Utah). Females lay approximately 50 eggs in loose clusters in bark cracks, under bark scales, and other protected sites.

Description

Adults: Male cankerworm moths are about 1 1/8 inches long and are dull gray-brown in color (Figs. 1, 3). Moths are active only at dusk to shortly after nightfall. Adults die shortly after mating and egg-laying. Female cankerworm moths are wingless, dull gray-brown, and about 5/16-inch long (Fig. 4). They crawl from the ground up tree trunks, and emit a sex pheromone to attract males for mating.

Eggs: Fall cankerworm eggs are laid in flat, neat rows that encircle twigs or small stems (Fig. 4). Individual eggs are barrel-shaped, and shiny gray in color with a light-brown ring around a dark brown spot. Spring cankerworm eggs occur in smaller clusters and are not as neatly arranged. The individual eggs are spindle-shaped and silvery-beige in color.

Fig. 3. Fall cankerworm adult.[1]

Fig. 4. Wingless female fall cankerworm adult laying neat rows of eggs on a twig.[3]

Larvae: Full grown cankerworms are about 1-inch long. Larvae are known as inchworms, and move by arching their mid body and bringing up the prolegs (or fleshy "false legs") to meet the thoracic (front) legs and then stretching the body flat again.

Fall cankerworm larval color ranges from light green to dark green, or light brown to black. They are distinguished from spring cankerworm in that they have three pairs of prolegs at the end of the abdomen, although the first pair of prolegs are reduced (Fig. 5). Usually fall cankerworms have three small stripes on either side of the abdomen. Spring cankerworm larval color ranges from yellow-green to yellow-brown to black (Fig. 6). They have one larger stripe down either side, and two pairs of prolegs.

Pupae: Cankerworm pupae are dark brown, 1/4-inch long, and wrapped in a cocoon of silk and soil particles. They are found 1-4 inches under the soil surface.

Fig. 5. Fall cankerworm larva. Note three pairs of prolegs (first pair are reduced).[3]

Fig. 6. Spring cankerworm larva. Note two pairs of prolegs.[3]

Feeding Damage

Cankerworm has been considered a pest in North America since colonial times, and today, is sometimes a severe problem in deciduous forests of eastern and central North America. Feeding damage has not historically been an issue in Utah because of the predominance of coniferous forests. But as food sources increase with increasing urbanization, we can expect to see regular cyclical invasions of cankerworm feeding in the canopies of Utah's deciduous trees. Stressed trees have a more difficult time recovering from defoliation and may become susceptible to other insect or disease attacks. In this case, branch dieback and reduced growth are common symptoms. Multiple years of defoliation can kill stressed or healthy trees.

Cankerworm larvae have chewing mouthparts and defoliate deciduous leaves. Larvae initially feed on the tissue between the small leaf veins, leaving leaves with a slight tattered appearance (Figs. 2, 8). As the larvae grow, they feed on all plant tissue except the midrib and major veins, leaving large holes, or during severe outbreaks, completely defoliated trees (Fig. 7). Healthy trees will refoliate within 4 to 6 weeks.

Native Utah trees can tolerate cankerworm feeding and defoliation. Insecticidal control is not warranted when the feeding is minimal. To help trees recover, provide optimal watering, fertilize, mulch within the drip zone (instead of turf), and prune when necessary.

Fig. 7. Heavy cankerworm feeding can defoliate trees.[4]

Monitoring

Regular insect monitoring is an important component of integrated pest management. Treating cankerworm larvae 10 days after egg hatch provides optimal control. Scouting can help determine when to treat for cankerworm larvae.

- Examine twigs of susceptible host trees in the late winter and flag egg clusters. At bud burst (or at 148-290 degree days using 50˚F lower developmental threshold), watch for larval hatch.
- Shake multiple branches over a sheet of white cardboard or cloth screen (beat tray method) in early spring to look for dislodged larvae. Repeat every other day until larvae are found or leaves have fully expanded.
- Examine terminals of several branches for early feeding in the spring, which appears as small, irregular holes between veins.
- Use a sticky barrier around tree trunks to trap females and prevent egg laying on twigs (Fig. 9).

Fig. 8. Cankerworm damage in early spring. Note the small larvae feeding between the veins.[2]

Fig. 9. A sticky barrier can prevent wingless females from moving up trees to lay eggs.[5]

Natural Enemies

Insects that attack the egg stage seem to be the most important predators in regulating cankerworm population size. After 2 to 3 years of a cankerworm outbreak, the population can be reduced by as much as 70-80% by the egg parasitizers. The most common is a tiny wasp, *Telenomus alsophilae*. Two other important parasitic wasp species are *Euplectrus mellipes*, and *Trichogramma minutum*.

Birds, as well as the ground beetle, *Calosoma frigidum* (Fig. 10), will feed on cankerworm larvae. Adverse weather, small mammals, disease, and starvation also contribute to cankerworm population decline.

Fig. 10. Ground beetles are natural enemies of cankerworm larvae.[2]

Chemical Control

Although insecticidal control for cankerworms is generally not recommended, persistent defoliation can be stressful to trees and may warrant an application. Note that for effective suppression, trees should be treated by a certified applicator that has equipment to reach all the limbs of the trees. Always follow the label.

Horticultural Oils: Oils applied during tree dormancy can smother exposed cankerworm eggs provided that coverage is thorough (e.g., Sunspray, Ultrafine, Orchex, Volck).

Reduced Risks Insecticides: There are several safe and effective products available for use soon after egg hatch (10 days). These products are most effective when larvae are <1/2 inch in length. They can be used around homes, wildlife areas, and water.

- Spinosad is a fermentation product derived from a bacterium (e.g., Conserve or Entrust).
- *Bacillus thuringiensis* (Bt) can be applied twice, spaced 5 days apart (e.g., Dipel, Foray, Xentari).
- Azadirachtin is an insect growth regulator extracted from seeds of the neem tree (e.g., Ecozin, Ornazin, Amazin).

Conventional Materials: If you miss the early treatment and need to suppress larvae >1/2 inch in length, there are several products available for cankerworm control in Utah, including: carbaryl, cyfluthrin, esfenvalerate, malathion, and permethrin.

Information Resources

Johnson, W. T. Cankerworm degree day information. Department of Entomology, Cornell University.

Booth, D. 1999. Cankerworms. Bartlett Tree Research Laboratories Technical Report.

Fiset, A. 2005. Shelterbelts, Trees and Shrubs. Western Committee on Crop Pests Guide to Integrated Control of Plant Pests. www.westernforum.org.

[1] Images courtesy of Jerald E. Dewey, USDA Forest Service (www.ipmimages.org).

[2] Images courtesy of Pennsylvania Department of Conservation and Natural Resources, Forestry Archive (www.ipmimages.org).

[3] Image courtesy of Marion Murrray, Utah State University IPM Project (www.utahpests.usu.edu).

[4] Image courtesy of USDA Forest Service, Ogden Archive (www.ipmimages.org).

[5] Image courtesy of William A. Carothers, USDA Forest Service (www.ipmimages.org).