

Common Insect Pests of Christmas Trees

Excerpted from insect fact sheets developed by the Maine Forest Service and available on their website
<http://www.state.me.us/doc/mfs/insecthome.htm>

APHIDS

Description and Damage

Aphids are small, soft-bodied sucking insects which pierce plant tissues and draw out the juices. They may or may not possess frail wings. Most trees and plants are attacked by aphids. Some of the aphids are very injurious when abundant as in the case of the balsam woolly aphid on fir. Most of the aphids which occur on shade and street trees do not cause serious damage but their habit of secreting a sticky material known as honeydew is sometimes annoying. When aphids are abundant, honeydew may fall as a mist on automobiles and other objects beneath the infested trees. A black fungus, known as sooty mold, often develops as a dull black film on the coating of honeydew. If allowed to dry and remain on surfaces for an extended period, this honeydew-sooty mold will be very difficult to remove and may discolor the surface to which it adheres.

Host Trees

Some of the host trees on which aphids may become abundant or noticeable include elm, maples, willow, balsam fir, spruce, and white pine. On elm, two common aphid species may cause trouble. These are the woolly apple aphid which causes stunted twigs and rosetted leaves and the leaf curl aphid curls or cups the leaves but does not rosette them. In both instances, woolly aphids are seen if the curled leaves are unrolled in early summer.

Quite conspicuous on silver maple is the woolly alder aphid which is covered with white woolly threads. Colonies appear as white woolly patches along the mid-vein on the undersurface of the leaves. These woolly threads can become an annoyance around homes in late summer as they accumulate on the ground underneath heavily infested trees.

The Norway maple aphid which commonly is found (through the summer) on the under-surface of Norway and sugar maple leaves is rather large, hairy, greenish, and brown marked. Heavy infestations of the aphid wrinkle, blacken, and stunt the leaves. They may also cause a leaf drop to occur in midsummer.

There are several species of aphids which are abundant on birches. One species that appears early causes corrugated folds on the leaves which become filled with aphids and white granular material on the undersurface of the leaf. In heavy infestations, premature leaf drop occurs and twigs and branches may die. Other species of birch aphids produce honeydew which blackens much of the foliage or cause leaves to drop readily when disturbed.

On Scotch, Austrian, and especially white pine, an aphid known as the **pine bark aphid** (*Pineus strobi*) may cover the trunk and branches in white woolly patches. Persistent and heavy infestations of this aphid will reduce tree growth, and may eventually kill trees.

The **white pine aphid** (*Cinara strobi*), a large black aphid, feeds in large clusters on twigs and branches of white pine. The eggs of this insect are oval and jet black, laid in rows of 5 or 6 on the pine needles and easily seen with the naked eye. Heavy infestation may seriously reduce the growth of trees.

On balsam fir, the **balsam woolly aphid** (*Adelges piceae*) may cover the tree trunks in masses of white woolly wax secreted by the aphids to cover themselves. When abundant, this aphid weakens and kills trees. Another phase of this aphid on balsam fir causes the tops of crowns to become distorted with "goutly" twigs that die.

Other injurious aphids are described on separate Maine Forest Service pest sheets. These are: balsam twig aphid which attacks fir and spruce; pine leaf aphid which attacks white pine, red and black spruce;

Cooley spruce gall aphid which attacks Colorado Blue, white Engleman, and Sitka spruces and Douglas fir; eastern spruce gall aphid which attacks Norway, white, red, and Colorado blue spruce.

Natural Control

Many natural enemies or predators such as lady beetles, syrphid fly larvae, and internal parasites are usually found with high aphid populations. Pesticides that are applied to foliage to control aphids can also reduce predator populations. Pesticides are usually recommended only in protection of high value crop trees in plantations such as Christmas trees.

BALSAM TWIG APHID *Mindarus abietinus* (Koch)

Symptoms and Damage

Sticky, curled and twisted new shoots in May and June on balsam fir usually indicate the presence of the balsam twig aphid. Feeding by this aphid may result in stunted shoot growth, and the curling or twisting of the needles makes the foliage unattractive for high quality Christmas trees. Damage to trees is primarily aesthetic and control is not normally recommended except on Christmas tree and wreath stock.

Hosts

Primarily balsam fir but also Fraser fir, white fir and spruces. Twisting and curling effects are not normally as evident on spruce.

Life Cycle and Habits

The insect overwinters in the egg stage on balsam fir twigs. The nymphs emerge in the spring and feed primarily on the old growth causing little damage at first. As the bud cap begins to break open, the aphids enter the buds to feed and start the next generation. After the buds open the second and third generations feed on the new needles, causing curling and permanent deformity of these needles as well as stunting new growth. At this time the aphids are covered with a white waxy wool and sticky honey dew which is quite noticeable on branch tips in heavy infestations. A fourth generation does little feeding but produces eggs which overwinter to repeat the cycle the next year.

BALSAM GALL MIDGE *Paradiplosis tumifex* Gagne

Symptoms and Damage

The balsam needle gall midge is often a serious pest of balsam fir which can economically affect the Christmas tree and wreath industries. Feeding of the young midge larvae on developing needles causes the formation of galls or swellings near the bases of the needles. The galled needles tend to drop prematurely, thinning out the foliage on the tree. Severely infested Christmas trees have reduced aesthetic value and may not be marketable for 2-4 years, until the damage can be sheared off or new growth can mask the damage. Forest trees suffer little permanent damage.

Hosts

Balsam fir and Fraser fir.

Life Cycle and Habits

Eggs are laid in the developing new shoots shortly after budbreak in mid- to late May. Trees with late breaking buds are less susceptible to gall midge attack since buds are still tight when adult midges are ovipositing. The young larvae feed at the base of developing needles causing needle tissue to grow around the tiny orange larvae. In heavy infestations, three or more galls on one needle are not uncommon. From mid-September to late November the mature larvae leave the galls and drop to the ground where they spend the winter in the litter. The larvae transform to pupae in May. Adult females emerge as tiny orange mosquito-like flies which mate and lay eggs in the new shoots to repeat the cycle.

When first formed, the galls or swellings on the needles are green in color, but toward mid-summer the galls turn yellow and eventually in late autumn the needles die and fall off leaving bare spots on the

season's twigs. Heavy infestations will remove most of the current needles from infested trees, making them unmerchantable for the Christmas tree grower, and useless for making wreaths.

COOLEY SPRUCE GALL ADELGID *Adelges cooleyi* (Gill.)

Symptoms and Damage

The Cooley gall adelgid is a problem in Douglas fir Christmas tree plantations especially when the two host species, spruce (primary host) and Douglas fir (alternate host) are planted close to one another. The galls which are caused by feeding of the nymphs (immature adelgids) on needles, occur only on spruce. Winged adult females emerge from galls and migrate to Douglas fir if it is present. The next generation nymphs feed on Douglas fir causing yellowing and kinking of the needles; and in cases of heavy infestation, partial or nearly complete needle fall.

Damage is most severe in Christmas tree plantations where aesthetic value is reduced by the presence of the unsightly galls on spruces and by the twisting and yellowing of the Douglas fir needles. Heavy infestations on Douglas fir can cause post-harvest needle fall.

Hosts

The spruce species most commonly involved as primary hosts in Maine are Colorado blue and white, although Englemann and Sitka are also affected. The alternate host is Douglas fir.

Life Cycle

The Cooley gall adelgid overwinters as a nymph. In the spring female adults deposit eggs under white, cottony wax near the terminal buds on spruce branches. The eggs hatch and the nymphs move to the expanding new growth. Their feeding activity at the base of new spruce shoots causes an elongate, cone-like gall in a matter of a few days. Fully-developed galls are 1 1/2 to 3 inches long, 1/2 to 3/4 inches in diameter, and are light green to deep purple in color when first developed. In July or August the galls open and winged adults emerge and fly to the Douglas fir host where they deposit eggs.

The nymphs appear as tiny, black, flat, oval objects with white, waxy, cotton-like threads along the body margin. Their fall feeding activity causes a light colored blotch to appear at the feeding site on the needle. Around May of the following year, the nymphs develop into "stem mothers" that are densely covered with a white, cotton wax and they lay eggs under this covering. The eggs hatch, nymphs feed and become adults to start the cycle over again. If the two host species are not close together then the adelgid can reproduce independently on either species.

EASTERN SPRUCE GALL ADELGID *Adelges abietis* (L.)

Symptoms and Damage

Green cone-like swelling at the bases of small twigs on Norway and white spruce usually indicate the presence of the eastern spruce gall adelgid. These galls are caused by the feeding of young nymphs (immature adelgids) that causes new needles to grow abnormally and fuse together in a light green swelling containing many insects. The galls, which are difficult to detect at first, later turn brown and become quite noticeable. Twigs so infested usually die. Individual trees vary greatly in their susceptibility to attack. Some trees will be heavily attacked while others nearby will have no galls at all. Old galls may remain on the trees for many years.

The galls reduce the attractiveness of Christmas trees and ornamentals and in severe cases may cause some tree disfigurement and stunting. Normally damage is considered aesthetic.

Hosts

Usually on Norway and white spruce although occasionally on red and Colorado blue spruce.

Life Cycle

This insect overwinters as small nymphs at the bases of buds. In the spring the nymphs molt to become stem mothers that lay eggs on the needles at about the time new buds are ready to break. The eggs hatch in about 10 days and the young nymphs begin feeding on needles. Feeding of the nymphs causes abnormal needle and twig growth resulting in the formation of pineapple-shaped galls. Gall tissue grows and encases the immature insects, protecting them from predators and other unfavorable conditions. The galls split open in late summer allowing mature nymphs to crawl out and molt to become winged, egg laying females. These females may stay on the host tree or fly to another, feed briefly, lay eggs on the bark and die. Eggs hatch in about two weeks and the overwintering nymphs attach themselves to twigs at the bases of buds.

SPIDER MITES

Symptoms and Damage

Numerous species of mites known as spider mites can infest forest and shade trees. These tiny spider relatives have the ability to spin fine silken webs over the foliage of trees. Some of the more notorious species are also known as red spiders due to their red color. Depending on the species or stage of maturity, colors may vary in different shades of yellow, green, orange, and red. Mites feed by piercing stylets into the surface of the foliage to draw out plant juices. Their feeding destroys the chlorophyll bearing cells at the surface of leaves or needles and results in a stippling or mottling of the foliage. Webbing may not always be readily seen on the foliage depending on the level of infestation and species. Mites, which are barely visible to the naked eye, may be detected by shaking and beating suspected foliage over a white sheet of paper. Any mites that are present appear as tiny dots crawling over the paper.

Hosts

All species of conifers and deciduous trees.

Conifers: One of the most important species on conifers is the **spruce spider mite**, *Oligonychus ununguis* (Jacobi). It attacks hemlock, spruce, arborvitae, pines, and balsam fir. Feeding damage occurs as tiny chlorotic flecks on the surface of needles and the foliage appears mottled. Fine webbing is also produced between the needles and foliage may collect dirt and dust. Damaged needles may dry up and drop off. Christmas trees may be severely damaged by this mite. Trees growing on poor sites may be killed.

Deciduous trees: A number of species attack various deciduous trees - the **oak red mite**, *Oligonychus bicolor*, can occur on oak, birch, beech and elms. It causes fine flecking on the upper surfaces of leaves and occasionally causes large portions of leaves to become yellowed or bronzed in appearance when very heavy. It seldom causes serious damage and is only conspicuous when most of the foliage is infested.

The **honeylocust spider mite**, *Eotetranychus multidigituli* (Ewing), which occurs only on honeylocust, causes extensive browning of foliage during the summer when populations are high.

Life Cycle and Habits

Most species overwinter as eggs although a few, including the honeylocust spider mite, overwinter as adults in bark crevices. The eggs hatch in the spring, and the six legged larvae feed on foliage and can reach maturity within a week. Mature mites have 8 legs, and are less than 1 mm long. There may be numerous overlapping generations and populations can build rapidly.

WHITE PINE WEEVIL *Pissodes strobi* (Peck)

Symptoms and Damage

The white pine weevil, which kills the top of conifers, is the most serious economic insect pest of white pine.

One of the first symptoms of attack in the spring is the presence of pitch flowing from the feeding punctures in the previous year's leading shoot. Beginning in late June the new growth on infested shoots starts to droop. Shortly thereafter the tops die and turn brown. Up to 2-3 years of top growth may be destroyed. The damage results in trees that are multi-topped, crooked, and of much lower value for sawtimber. Plantations, open-grown trees, and ornamentals are most heavily affected.

Hosts

Eastern white pine, Colorado blue spruce, Norway spruce, jack pine, Scotch pine, mugo pine, and native spruces.

Description and Life Cycle

The adults, which are small brownish weevils (snout beetles), become active, very early in the spring and move up on to the previous years' shoots to feed. They may frequently be found "nestled" around bud clusters at the tips of the shoots. The adults mate and lay eggs from early May through June in the bark of the previous year's leader. Upon hatching the young, legless grubs start tunneling downward under the bark. As they progress downward, the grubs gradually enlarge their tunnels until they eventually completely girdle the infested shoot and may kill the top 1 1/2 - 2 feet of the tree. Mature grubs, which are yellowish white, legless and about 7 mm long, bore slightly into the woody stem where they form fibrous chip cells in which to pupate. By mid-July some weevils have transformed to the adult stage and start to emerge from the shoots. The new adults feed for a time on new shoots and by October or November all have entered the ground litter at the base of trees to overwinter.

Control Measures in Plantations

Non-chemical: Preventive Pruning of Infested Leaders - At low infestation levels the prompt removal and destruction of infested leaders before the beetles emerge reduces the chance of weevil population buildup. Infested leaders should be pruned at a point just into healthy tissue below the tunneling grubs. Immediate destruction (burning is suggested) of cut leaders is necessary to destroy the larvae and pupae. Wilting of leaders may be detected from late June through July. Pruning should be completed by mid-July prior to adult emergence. Pruning before completion of shoot growth encourages secondary budding on the pruned leader and may result in faster terminal recovery. Early pruning may also prevent the grubs from penetrating the node of the first whorl of branches, thereby reducing the amount of injury.

Cultural Methods - Refraining from planting white pine or spruce in areas of high weevil hazard are alternatives to be considered. Heavy clay soils and heavily sodded fields have high weevil hazard potential.

Partial shade will help prevent the leader from becoming an optimum egg laying site because of its effect in reducing bark thickness and bark temperatures. Overtopping hardwoods or other conifers may help protect young pine and spruce from weevil damage when the young trees are in greatest need of weevil protection. Density of the overtopping species should be managed to maintain about 45-50% shade until final release when the pines reach a height of 16 to 18 feet.

Closer spacing of trees in a plantation will stimulate height growth and natural pruning to permit faster recovery.