

# INSECT PESTS OF CHRISTMAS TREES



Cooperative Extension Service  
The Ohio State University

# Insect Pests Of Christmas Trees

L-257, "Insecticides for Control of Insect Pests of Christmas Trees" is a companion publication of Bulletin 619, "Insect Pests of Christmas Trees." It give pesticide formulations, amount of use, and when to apply pesticides.

prepared by  
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Christmas trees are the favorite food of a number of insects and mites. Some of them suck sap from the needles and branches; some feed upon the needles or eat other parts of the tree, while still others bore into the buds or deform them in some way.

The abundance of insect and mite pests varies from year to year and from plantation to plantation. It is difficult to tell which pests are going to be a problem from one year to the next, or how severe they may become. Most plantations will be attacked by one or more pests sometime between setting and harvest.

These pests can kill young trees. However, more often they affect the growth of the buds, reduce tree quality, and reduce the percentage of marketable trees.

Frequent tree inspection will help detect an invading pest early and provide time to apply an insecticide and prevent the pest from getting out of hand. Early detection and spot treatment may prevent a pest from spreading over an entire plantation, thereby requiring less expensive and extensive spraying.

During inspection, unfamiliar pests may be encountered. They may be destructive, beneficial, or totally insignificant. Specimens may be collected in a bottle and taken to the county extension agent, or sent to: Extension Entomologist, 1735 Neil Avenue, B&Z Bldg., OSU, Columbus, Ohio 43210 for a free identification and supplemental information.

This bulletin has been prepared to help one become more familiar with the identity of some of the major insect and mite pests of Christmas trees, and to assist the grower in knowing how to minimize his damage.

For each pest discussed, there is a description of the insect, host list, type of injury caused, life cycle, and brief control suggestions. A current copy of Bulletin 504, "Insect and Mite Control on Ornamentals," will provide more detailed information on insecticides, miticides, and control measures. The bulletin is available from county extension offices.



# HOST-PEST INDEX

## DOUGLAS FIR — *Pseudotsuga*

Bagworm  
Cooley Spruce Gall Aphid  
Pine Needle Scale  
Spruce Spider Mite  
Pales Weevil  
Northern Pine Weevil

## FIR — *Abies*

Bagworm  
Balsam Twig Aphid  
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## PINE

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European Pine Shoot Moth  
Nantucket Pine Tip Moth  
Northern Pine Weevil  
Pales Weevil  
Pine Bark Aphid  
Pine Needle Scale  
Pine Root Collar Weevil  
Pine Tortoise Scale  
Sawflies  
Yellow Bellied Sapsucker  
Zimmerman Pine Moth

### RED PINE — *Pinus resinosa*

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European Pine Shoot Moth  
Nantucket Pine Tip Moth  
Northern Pine Weevil  
Pales Weevil  
Pine Needle Scale  
Pine Root Collar Weevil  
Pine Tortoise Scale  
Sawflies  
Spotted Pine Aphid  
Zimmerman Pine Moth

### SCOTCH PINE — *Pinus sylvestris*

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European Pine Shoot Moth  
Nantucket Pine Tip Moth  
Northern Pine Weevil  
Pales Weevil  
Pine Bark Aphid  
Pine Candle Moth

### SCOTCH PINE — *Pinus sylvestris* (continued)

Pine Needle Scale  
Pine Root Collar Weevil  
Pine Tortoise Scale  
Sawflies  
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Zimmerman Pine Moth

### WHITE PINE — *Pinus strobus*

Bagworm  
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Northern Pine Weevil  
Pales Weevil  
Pine Bark Aphid  
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Pine Tube Moth  
Sawflies  
White Pine Aphid  
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## SPRUCE

### COLORADO SPRUCE — *Picea pungens*

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Cooley Spruce Gall Aphid  
Pine Needle Scale  
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Spruce Spider Mite

### NORWAY SPRUCE — *Picea abies*

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Eastern Spruce Gall Aphid  
Pine Needle Scale  
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Spruce Spider Mite

### WHITE SPRUCE — *Picea glauca*

Bagworm  
Balsam Twig Aphid  
Eastern Spruce Gall Aphid  
Pine Needle Scale  
Spruce Needle Miner  
Spruce Spider Mite

## ALLEGHENY MOUND ANT

*Formica exsectoides* Forel

**Description:** The adult ant is about 3-6 mm long. Its head is reddish-brown and about twice as wide as long. The thorax is reddish-brown and feathered, while the tail-end is reddish and surrounded by a fringe of hairs. Legs are generally brownish to dark red.

**Hosts:** White pine, red pine, Scotch pine, red cedar, and spruces.

**Injury:** The Allegheny mound ant nests in the soil and builds mounds that may measure up to 4 feet high and 6 feet across. These mounds are usually constructed in openings or at the edge of tree plantings. All vegetation, except large trees, may be destroyed in an area 40-50 feet in diameter around the mound. Trees 2-15 years old are most susceptible to attack. The ants apparently do not feed on the trees, but kill them to keep the mounds from being shaded. Formic acid injected by the ants into the vegetation kills it.

**Life cycle:** These ants overwinter in the soil under the mounds. They forage for living and dead insects and honeydew from April to September. Several generations are produced each year and queens and workers apparently live for several years.

**Control measures:** Most ants are easily controlled by applying a residual insecticide spray to the mound and the area several feet out from the mound. Leveling the mound before spraying may result in quicker destruction of the colony. Reappearance of a mound indicates that another treatment is needed.



Mound of Allegheny Mound ant

## BAGWORM

*Thyridopteryx ephemeraeformis* (Haworth)

**Description:** The "bag" of the bagworm is a small, carrot-shaped structure constructed from bits of foliage chewed-up by the larva that lives inside it. The adult female bagworm is grub-like in appearance & resembles the larval stage. She spends her entire life inside the bag. The male is a small, hairy-bodied, dark-colored moth with clear wings. The bagworm larva has a shiny black head and amber-colored body. When full-grown, the larva and bag are about 2 inches long.

**Hosts:** Red cedar, arborvitae, maple, boxelder, sycamore, willow, black locust, juniper, elm, linden, poplar, sweet gum, oak, apple, cypress, spruce, wild cherry, sassafras, persimmon, and many others.

**Injury:** Injury by the bagworm is caused by the larvae feeding on the foliage. Evergreens may be defoliated and killed. Shade trees may be stunted, or have growth retarded from a heavy attack by this insect. Twig dying might also result from the silken band spun around the twigs by the larvae at maturity.

**Life Cycle:** The bagworm overwinters as an egg inside the carrot-shaped bag attached to a twig. The eggs hatch in early June. Young larvae begin feeding and constructing a bag around themselves from bits of foliage upon which they feed. The bag is enlarged by the larva as it grows and feeds. By late August, the larvae are full-grown at which time they spin a silken band around a twig and the bag becomes permanently attached. In September or October, the adult males emerge from their bags and seek the females, which remain in their bags and are fertilized there. Eggs are laid and remain in the bags to overwinter.

**Control Measures:** Hand-picking and destroying the bags between October and May will eliminate the eggs. Insecticidal sprays are most effective about late June when the bagworms are small. Older larvae

are more difficult to control, so control measures should be applied by about mid July.



Mature bagworm



Young bagworm

## BALSAM TWIG APHID

*Mindarus abietinus* Koch

**Description:** This aphid is a pale-green, soft-bodied, sucking insect covered with a white waxy material. Some are also bluish-gray and plump.

**Hosts:** Fir, spruce, and juniper.

**Injury:** Damage by the feeding aphids causes the needles and twigs to curl. Some needles are killed and bark on twigs becomes roughened. Large amounts of honeydew are produced which give the needles a "shellaced" appearance. Black sooty mold may grow on the honeydew.

**Life cycle:** The balsam twig aphid overwinters as an egg on the bark. Eggs are covered with tiny rods of white wax. The eggs hatch in early spring and the young aphids begin feeding, causing their typical damage. The young are born alive throughout the summer. Some of the aphids lay eggs in early summer and these overwinter to start the population the following spring.

**Control measures:** Control measures should be applied in late April or early May to prevent damage to the needles and stunting of the twigs. Later sprays may be needed to clean-up the infestation. Since the overwintering eggs are very conspicuous on the bark, this may serve as a useful measure to determine the amount of injury that may be expected the following year.



Balsam Twig Aphid damage

## COOLEY SPRUCE GALL APHID

*Adelges cooleyi* (Gillette)

**Description:** Cooley spruce galls appear as 2-2½ inch long, "hot dog-shaped," light green to purple growths at terminal and lateral buds. In late summer, the galls turn brown and remain on the trees.

**Hosts:** Engelmann spruce, Sitka, Oriental spruce, Colorado blue spruce, and Douglas fir.

**Injury:** On spruce the galls form at lateral terminal buds and severely stunt them. These same galls turn brown and remain on the tree reducing the tree quality. On Douglas fir, yellow spots and bent needles result from the feeding aphids and the tree appears speckled with tiny cotton-like balls. Thus, tree quality is reduced.



Cooley Gall Aphids on Douglas Fir

**Life Cycle:** The Cooley spruce gall aphid requires two years and two hosts (Douglas fir and spruce) to complete its normal life cycle. The aphid overwinters as an immature female at the base of a terminal bud. In the spring, the females mature and lay several hundred eggs on the lateral terminals. Eggs hatch and the young nymphs migrate to new 2 to 2½ inch spring growth where they feed at the base of the growing needles. Their feeding produces the "hot dog-

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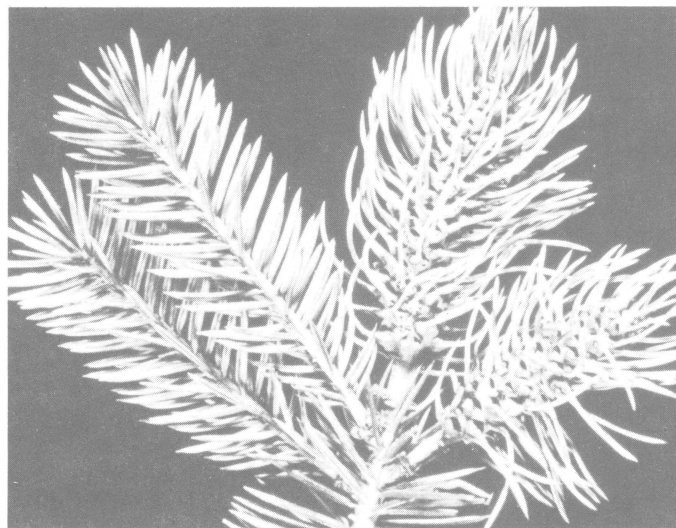


Feeding damage of Cooley Gall Aphid on Douglas Fir



shaped" gall. Aphids live in chambers inside the gall tissue. By mid-summer the galls dry out, chambers open, and aphids emerge. They migrate to Douglas fir or spruce. On Douglas fir, eggs are laid on the needles and a generation of woolly aphids is produced. Some of the aphids develop wings and fly back to spruce to deposit eggs which produce the overwintering population. Others are wingless and remain on Douglas fir, where they deposit eggs that again produce the overwintering aphids. The life cycle of this aphid, when it remains on spruce, is similar to that of the eastern spruce gall aphid.

**Control Measures:** Once the Cooley galls begin to form, insecticidal sprays may be ineffective against them, as the insects are protected by the galls. The aphids are most vulnerable to insecticides in the spring before the galls form and again in the fall after the galls open and aphids come out. **On spruce**, apply an insecticide just before the buds start to break in the spring, which is in early April and/or after the galls open in late July or early August. **On Douglas fir**, apply a spray at bud break and/or in October.



Opened Cooley Spruce Galls on Carorado Spruce

## EASTERN SPRUCE GALL APHID

*Adelges abietis* (L.)

**Description:** The eastern spruce gall resembles a pineapple. Terminal buds are affected, however, new normal growth continues beyond the gall. Galls are green in the spring, turning brown in late summer. Old and new galls may be found on the same tree.

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

**Injury:** Wherever a gall forms, that branch is severely stunted. The galls turn brown in late summer and remain as unsightly brown masses. Infested trees are seldom killed, but tree quality is greatly reduced.

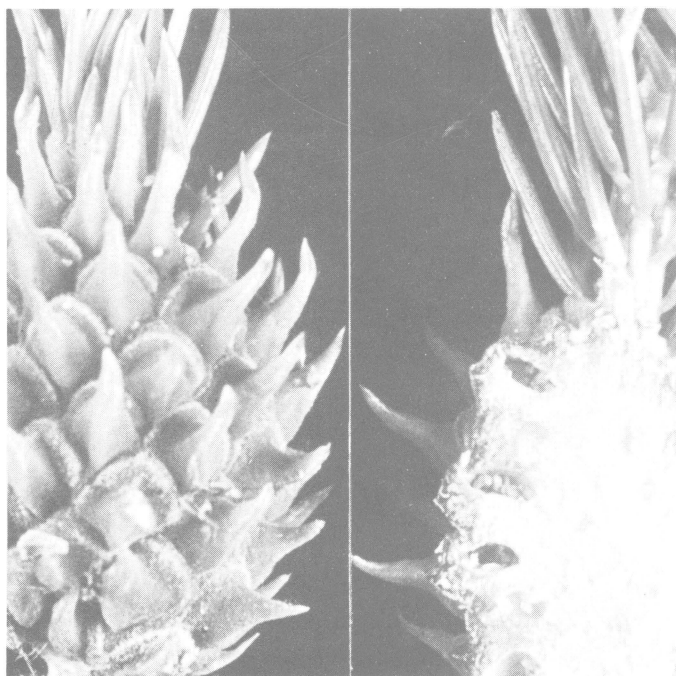
**Life Cycle:** The aphid overwinters as a partially grown female, called a "stem mother," at the base of a terminal bud. In the spring about the time the buds start to grow, the female lays from 100-200 eggs. Eggs are laid in small groups and are covered with waxy threads. They hatch in about 10 days and the young nymphs begin feeding on the newly developing needles. It is during this feeding period that the characteristic pineapple-shaped gall begins to develop. The gall

grows and contains many individual cells, each inhabited by aphids. In mid to late September, the gall cells open and female aphids emerge. They lay eggs near the tip of the needles and these eggs hatch into the individuals that overwinter.

**Control Measures:** Once a gall has formed, insecticidal sprays may be ineffective because the gall-producer is protected by the gall. The insects are vulnerable to insecticides in the spring before they start forming the galls and again in the fall after the galls open and the aphids come out. Spring sprays should be applied just before buds start to break and fall sprays about mid to late September and possibly early October.



Typical Eastern Spruce Galls on spruce



Eastern Spruce Gall—Cutaway showing aphids

## ERIOPHYID MITES

*Trisetacus gemmavittans* Styer

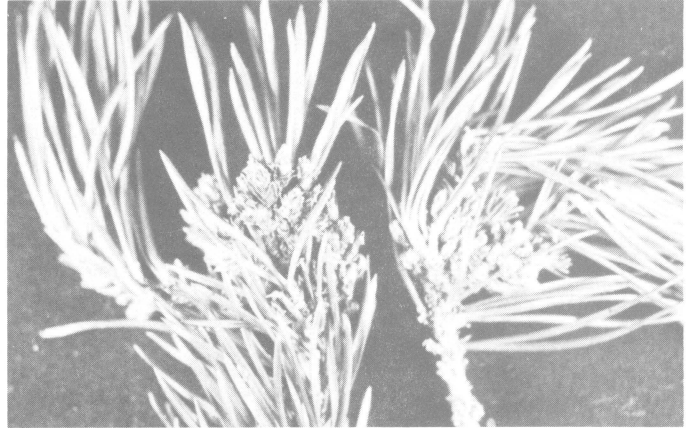
**Description:** Eriophyid mites are carrot-shaped, rather cream-colored, and too small to see with the naked eye. They are probably better known as gall producers on deciduous trees. Over 80 species of eriophyid mites have been identified in Ohio, many for the first time.

**Hosts:** Scotch pine and numerous deciduous trees.

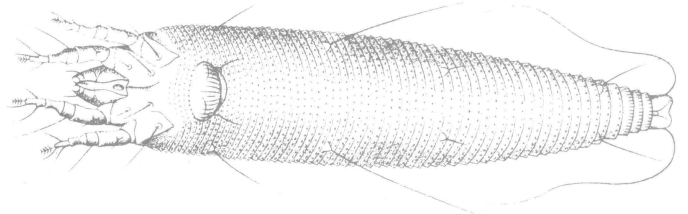
**Injury:** Injury on Scotch pine results in a rosette of buds. Infested trees become stunted, misshapened, and unsightly, but none are killed.

**Life Cycle:** The life cycle of this mite is not completely known, but it apparently overwinters in the egg, nymph, and adult stages in protected places on the tree. In the spring, the mites migrate to buds where they feed and cause their typical damage. Eggs are laid and several generations appear throughout the summer.

**Control measures:** The presence of this mite would probably not be detected on Scotch pine unless rosetting of buds were observed. The mites can be controlled any time they are on the trees. However, mid to late May probably is the best time. Sprays at this time should prevent rosetting of buds. A second spray may be needed 10-14 days later to kill newly hatched mites. Most sprays do not kill or affect egg development.



Scotch Pine bud rosetting caused by Eriophyid Mite



Typical Eriophyid Mite greatly enlarged

## EUROPEAN PINE SHOOT MOTH

*Rhyacionia buoliana* (Schiffermuller)



Crooking of terminal shoot by European Pine Shoot Moth larvae

**Description:** The adult has a 3/4-inch wing span. Wings are mottled in orange-red color and the legs are whitish. Full-grown larvae are about 5/8-inch long, have a brown body and a black head.

**Hosts:** Scotch, red, and Mugho pines.

**Injury:** Overwintering larvae bore and tunnel into buds and elongated shoots. Some buds are killed. Weakened shoots continue to grow, but often in a S-shape. Newly hatched larvae feed in needle sheaths. Later these needles turn brown and may be seen hanging on the tree. As larvae grow, they may feed on more than one bud, partially or totally hollowing them out. Bushy tips result from damaged buds.

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European Pine Shoot Moth larvae and pupa

**Life Cycle:** The insect overwinters as nearly full-grown larvae. In mid April, the larvae resume feeding. Pupation takes place inside feeding tunnels and adults emerge in mid June to mid July. The females lay about 50 eggs indiscriminately on the trees. Eggs hatch in about 8-10 days. The young larvae feed in the needle sheaths and later in buds and shoots. By fall, they are nearly full-grown. Only one generation occurs each year.

**Control Measures:** Infested tips may be pruned off and burned before the first part of June to control overwintering larvae. If a spray is to be used, it may be applied in mid April against the larvae that resume early spring feeding and/or in late June, or early July for new generation larvae.

Cutaway showing European Pine Shoot Moth larva and damage



## NANTUCKET PINE TIP MOTH

*Rhyacionia frustrana* (Comstk.)

**Description:** Adults are small gray moths with a wingspread of 9-15 mm. The front wings are coppery-red, mixed with gray. Full-grown larvae are caterpillar-like, brown to orange in color, and usually reach a length of about 10 mm.

**Hosts:** Nearly all pines, except white pine, are attacked.

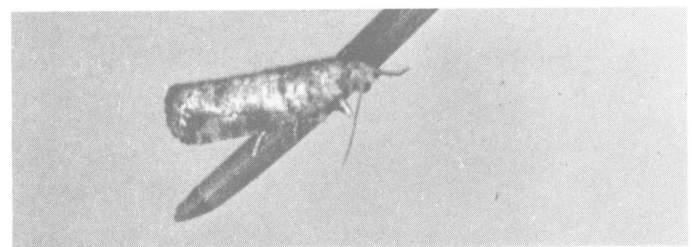
**Injury:** This species causes damage very similar to that of the European pine shoot moth. Early larval feeding occurs on the surface of new growth or at the base of the needles. This feeding is usually preceded by the construction of small tent-like webs between the new needles and the stems. Later injury occurs as the larvae bore into the buds and growing shoots. Only the new growth is attacked. This rarely results in the loss of the entire tree, but heavily infested trees are severely stunted. Trees over 15 feet tall are seldom damaged.

**Life Cycle:** Overwintering occurs as pupae within infested shoots. Adults emerge on warm days in early spring and begin depositing eggs on both old and new growth. The young larvae feed only shallowly on the new growth and bore into needle fascicles. Later, they migrate to new shoot tips and tunnel into bud and stem tissue. The period of larval feeding lasts about 3-4 weeks. Pupation takes place inside the shoots and a second complete generation occurs during the latter half of the summer.

**Control measures:** Sprays may be applied in mid May to early June to control the young larvae as they feed randomly before boring into needles. A thorough treatment of the tree terminals is essential to good control. The second generation, which appears in late July to early August, may also need to be controlled.



Typical damage caused by Nantucket Pine Tip Moth



Nantucket Pine Tip Moth adult



## NORTHERN PINE WEEVIL

*Pissodes approximatus* Hopkins

**Description:** The adult is a typical snout-beetle, 5-8 mm long, brown in color with tufts of white and reddish-brown scales forming spots and markings on the thorax and wing-covers. Larvae are white, legless grubs with brown heads. They attain a length of about 12 mm when full-grown.

**Hosts:** Most species of pines are subject to attack.

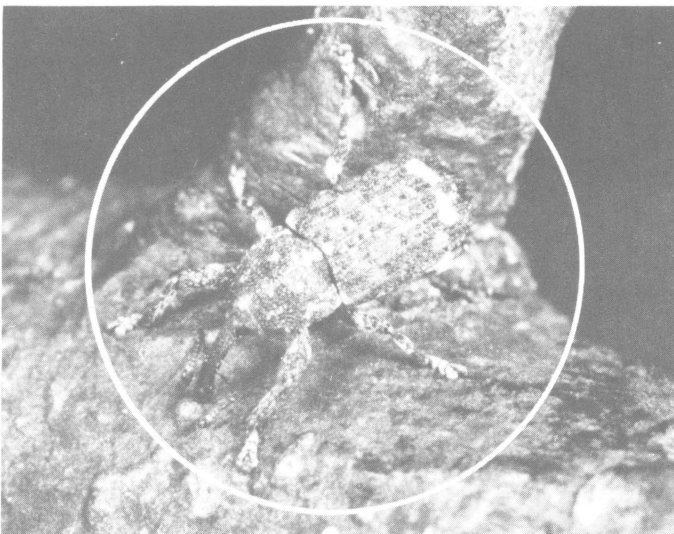
**Injury:** Most of the damage to Christmas tree plantings is caused by the feeding of adult weevils on the twigs and small branches. Unlike Pales weevil, the principal injury occurs to the inner bark, which is reached through small puncture holes in the outer bark. Some injury also may occur to weakened or dying trees by the larval stage. However, these trees are not usually suitable as breeding sites.

**Life Cycle:** Northern pine weevils normally overwinter as adults beneath the loose duff or top soil around host trees. In late April or early May, adults emerge and begin feeding on the twigs and branches. Egg laying begins a few weeks later and may continue throughout most of the summer. Eggs are deposited beneath the bark of stumps from trees cut the preceding fall, as well as in other dead or dying trees, logs, etc. Mature larvae excavate an elliptical area on the surface of the outer wood and pupate there within a cocoon made of excelsior—like wood fibers. Adults usually emerge during August and September and feed until temperatures drop.

**Control Measures:** To prevent damage on young seedlings and to the twigs of pines, a spray may be applied some time around late April to early May and/or in August to September for newly emerged adults. The exact time to treat is best determined by examining the trees for signs of circular feeding holes on the twigs and/or the presence of adults. It may be necessary to inspect for adults after dark. Since the larvae live in cut tree stumps, pulling and destroying these stumps as well as damaged, dead, or dying trees will destroy the larvae and eggs. This should be done before July 1. Seedlings may have their roots treated with an insecticide dip, or with an insecticide at the time of planting.



Typical Northern Pine Weevil twig injury caused by adult



Northern Pine Weevil adult



Left, closeup showing adult feeding punctures  
Right, excelsior-like cocoons found under bark

## PALES WEEVIL

*Hylobius pales* (Herbst)

**Description:** Adult weevils are 6-10 mm long, black to reddish-brown in color and bear small yellowish spots on the wing covers. Larvae are typical weevil grubs—white with brown head, legless, rather C-shaped, and slightly longer than the adults.

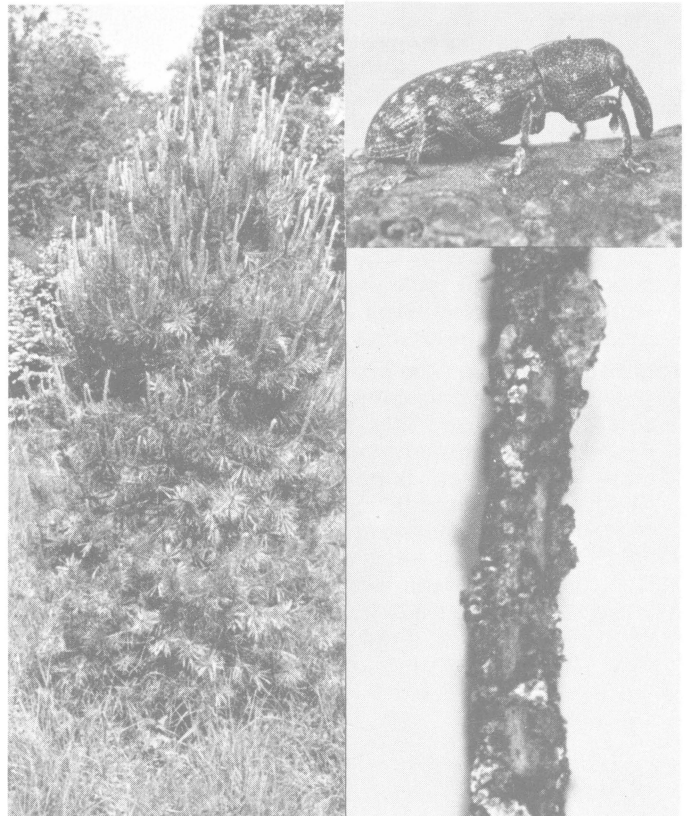
**Hosts:** All species of pine are considered susceptible to Pales weevil feeding injury, although white pine is preferred. Most other coniferous evergreens also are subject to attack, but to a significantly lesser degree. Only the roots of pine have been known to harbor the larvae.

**Injury:** Most of the serious injury occurs to small seedlings or saplings as a result of girdling by the adults. The weevils feed by puncturing small holes or pits in the bark. When adult feeding is heavy, the holes tend to run together and effectively girdle the tree. Injury to larger trees is normally confined to the smaller branches and terminals; nevertheless, this will still cause “flagging” of the branches and reduce the salesability of the trees. There has been some evidence of larval injury to the roots of healthy trees, when in close proximity to cut stumps. However, this is an exception rather than the rule.

**Life Cycle:** The Pales weevil overwinters as an adult beneath the litter around a tree, or as a larva in the roots. Overwintering adults emerge from April to June and feed for awhile on the tender bark of the twigs and at the bases of seedlings. Feeding occurs at night and the weevils hide in the soil around the trees in the daytime. Egg laying begins about July 1. Adult females burrow through the soil to the roots of cut stumps, dead, or dying trees and begin depositing eggs beneath the root bark. Larvae tunnel and feed within the roots the rest of the summer, usually moving farther away from the stumps. Pupation occurs within an excavated cell in the sapwood covered by excelsior-like wood fibers. Most of the new adults emerge during late September and October and feed for a short time before hibernating.

**Control Measures:** Adult feeding damage may be prevented by spraying young seedlings and twigs with insecticide when the adults come out of hibernation, sometime from mid April to mid May. The exact time

is best determined by examining twigs for small, circular feeding holes and/or a nighttime inspection for adults. Most feeding damage probably will occur before July 1. Since new adults emerge in late September and October, sprays may be effective at that time, too. Pulling and destroying stumps and weakened or damaged trees before July will reduce places for the weevils to lay eggs and, likewise, will destroy any larvae that may already be present. If stumps can't be pulled, treat them with a mixture of insecticide and motor oil. Young seedlings may have their roots dipped in insecticide, or an insecticide may be applied around each at planting to protect them against Pales weevil.



Left, severe twig damage caused by adults—Right Top, Pales adult—Lower, adult feeding injury



Typical breeding site of Pales Weevil larvae—note adults in circle



Typical twig injury caused by Pales Weevil adult



## PINE BARK APHID

*Pineus strobi* (Hartig)

**Description:** This aphid is rather small, dark and covered with white flocculent wax. Infested trees may have their trunks so heavily infected that they appear to be whitewashed. Small patches of aphids may be found at the base of needles, on twigs, and branches, too.

**Hosts:** White, Scotch, and Austrian pines.

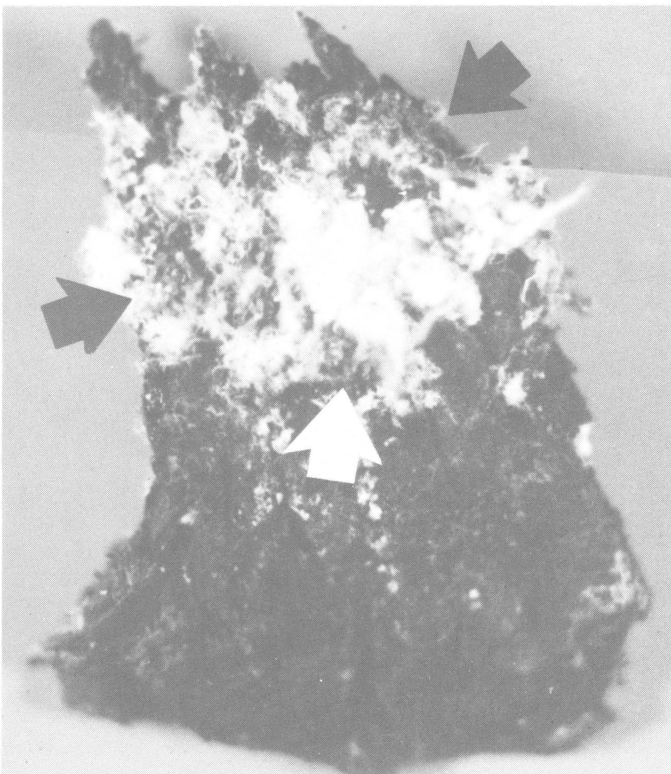
**Injury:** Aphids suck sap from the trees and cause needles to turn yellow, die, and fall off. Small trees may be badly stunted and even killed. Larger trees may have poor color and poor growth.

**Life Cycle:** Aphids spend the winter on various parts of the tree as mature females covered with the waxy filaments. In the spring, the females lay eggs that hatch into both winged and wingless females. The wingless forms remain on the host and produce 5 or more generations. Some of the winged females fly to other hosts to lay eggs.

**Control Measures:** Overwintering females may be killed by a dormant oil spray. The dormant oil must be applied before growth starts and when the temperature is above 40 degrees F. for a 24-hour period. Oil will injure tender, newly forming needles. Even if an oil spray is applied, an inspection should be made in early May to determine the extent of survival of the aphids. A mid May spray applied thoroughly to the infested trees should control the population. A spray could be applied later in the season or at any time the aphids are present in large numbers. However, early spring sprays will prevent damage from occurring later on.



Pine Bark Aphid damage in White Pine



Closeup of Pine Bark Aphid eggs and waxy covering



Pine Bark Aphid damage on Scotch Pine twigs



## PINE NEEDLE SCALE

*Phenacaspis pinifoliae* (Fitch)

**Description:** This scale gets its name from the oyster-shell shape of the waxy coating that covers the insect. The female scale is yellowish-white and about 1/9-inch long. The male is white and about 1/12-inch long. Foliage of heavily infested trees takes on a whitened appearance.

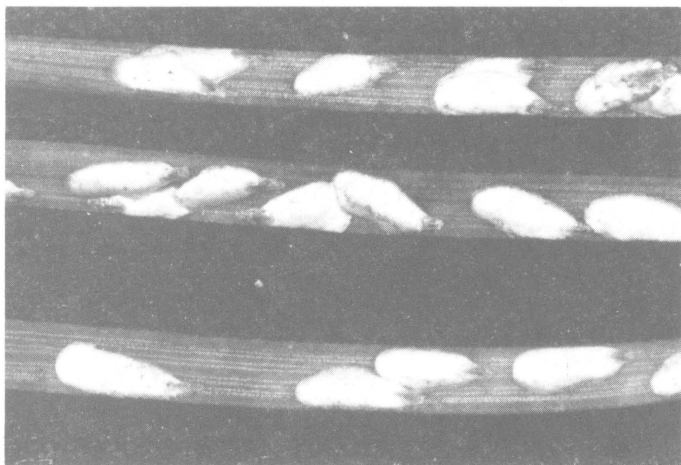
**Hosts:** Austrian, red, Mugho, Scotch, and white pine, Douglas fir, most spruces and cedars.

**Injury:** The scale sucks sap from the needles, causing them to turn yellow and then brown. A very heavy infestation causes a loss of vigor, sparse foliage, and death of twigs.

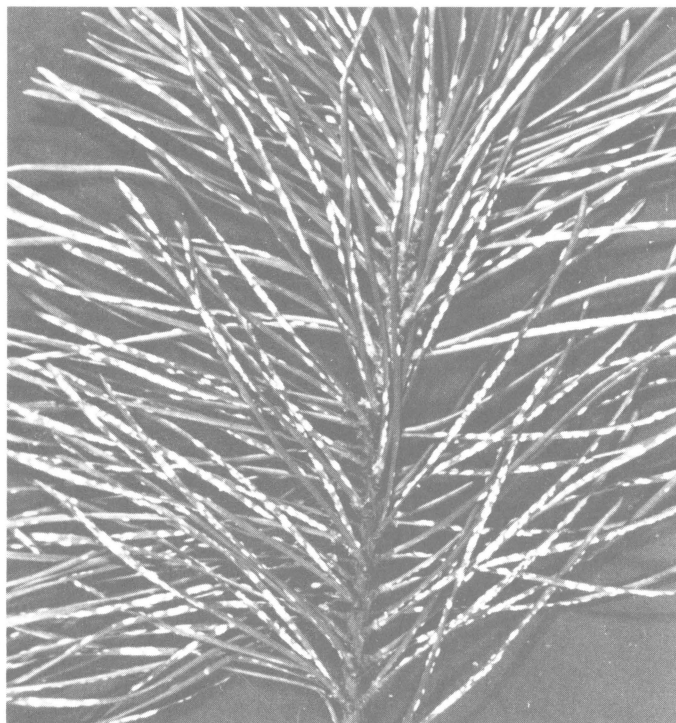
**Life Cycle:** Winter is spent as reddish eggs under the

female scales. As many as 30 eggs may be found under one scale. They hatch into crawlers about mid May. The crawlers move about on the needles and then settle down to feed and secrete the characteristic oyster-shell waxy covering over themselves. Maturity is reached in early July. Eggs are laid for a second generation and the second generation crawlers appear in mid July.

**Control Measures:** A dormant oil spray may be applied in the spring before growth starts to kill the overwintering eggs. Foliar sprays against the newly hatched crawlers would need to be applied about late May for the first generation and late July or early August for the second generation crawlers.



Closeup of Pine Needle scale



Heavy Pine Needle Scale infestation

## PINE ROOT COLLAR WEEVIL

*Hylobius radialis* Buchanan

**Description:** The adult is a snout beetle, dark reddish-brown to nearly black. It is marked with irregular white-to-yellow hairy patches. It resembles the Pales weevil, but is larger (about 3/8-to 1/2-inch long). The larva is white with an amber-brown head. It is legless and rests with its body in a curved position.

**Hosts:** Scotch, red, Austrian, Mugho, jack, and white pines.

**Injury:** Larvae injure the bark and cambium of the hosts around the roots and root collar beneath the soil. This restricts the flow of nutrients, weakening the tree and stunting it. Heavy winds or snow may cause weakened trees to blow over. Heavily girdled trees die standing. A swollen trunk at ground line and blackened pitch oozing out indicate a severe infestation.



Pine Root Collar weevil damage of crown and roots—note swollen trunk area in plant at right

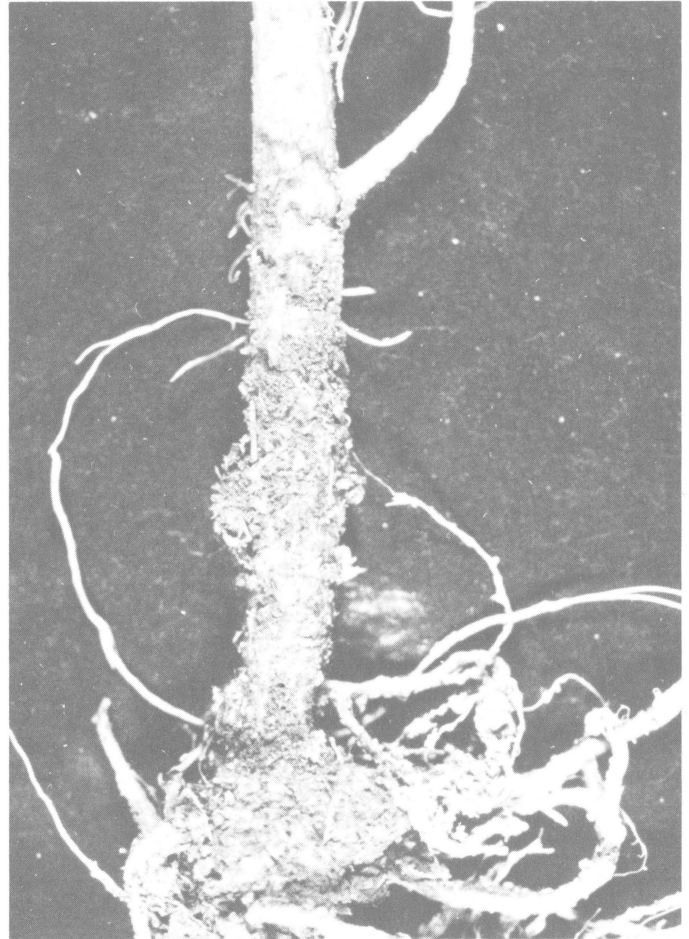
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**Life Cycle:** The winter is spent as an adult in the soil or in bark crevices and also as nearly full-grown larvae under the bark in the root collar area. Eggs are laid from early May to late September, the peak occurring in late June, or early July. Eggs hatch in about 2 weeks and the larvae feed until cold weather. They remain under the bark until the following August to October, when they emerge as adults. Most adults overwinter a second year and are active a part of the following season. Nearly all stages of the insect can be found during most of the year. All stages, except eggs and very young larvae, can be found in the winter.

**Control Measures: Determining the Need For Control Measures**—the following guides may be used in estimating pine root collar weevil populations and the need for control on young pines (4 to 15 feet tall).

An infestation is considered moderate to heavy when at least three larvae and three pupae are found per tree on the collar or in the pitch-infiltrated soil nearby. A simple yet reliable method of estimating the average number of insects per tree is to determine the percentage of trees infested by at least one larva or pupa per tree. On the average, when 80 to 85 percent of the trees are infested and at least 3 larvae per tree are present, control measures are needed. At least 20 trees selected at random must be examined in a small stand; more in large stands. When some trees are already turning yellow or falling down, at least 95 percent of the trees are infested.

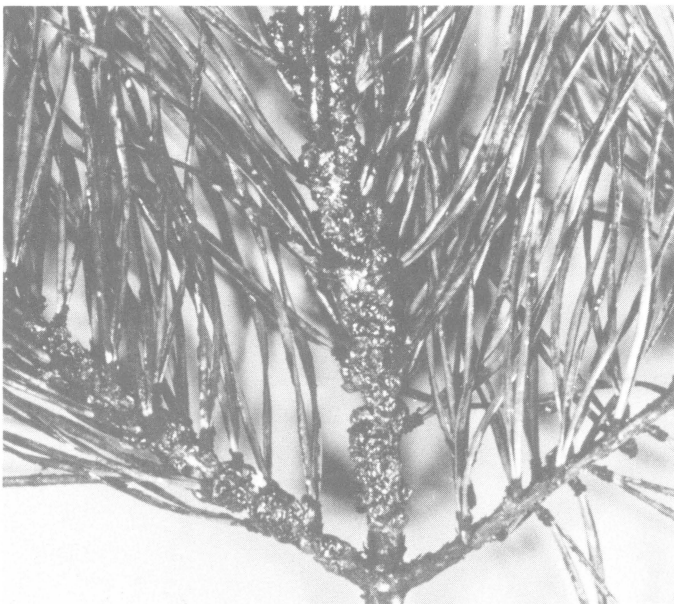
Adult weevils can be controlled with an insecticidal spray by thoroughly wetting the trunk and the soil around it. Extend out at least 8 inches from the base. The first spray should be applied about mid May to control the overwintering weevils. Apply a second spray in mid August for newly emerged weevils, and a third spray in early September would aid in controlling late emerging ones.



Pine Root Collar Weevil feeding on seedling pine

## PINE TORTOISE SCALE

*Toumeyella parvicornis* (Cockerell)



Old Pine Tortoise Scales and sooty mold

**Description:** This scale gets its name from the shape and coloration of the mature females, which resemble miniature tortoises or turtles. Each is about 6 mm long, oval to elongate in shape, and reddish-brown in color with a darker pattern of mottling. Eggs are ellipsoidal and slightly pinkish, almost transparent. Nymphs develop a powdery covering around their margins shortly after hatching.

**Hosts:** Most species of pines are susceptible to attack, but of the ornamental types, Scotch, Austrian, Mugho, and red pines seem to be preferred.

**Injury:** This scale infests the twigs and branches. Feeding damage results in needle yellowing and short needle growth. Heavy infestations may cause branch mortality or death of the entire tree. Lower limbs are usually more severely injured than higher limbs. The large amounts of honeydew produced result in the growth of black sooty mold on the branches and needles. Large numbers of ants are attracted to the honeydew upon which they feed.

**Life Cycle:** This species has but one generation a year in Ohio, overwintering as immature female scales on the twigs and branches. The scales reach maturity by

(continued next page)

June at which time the females lay their eggs. The eggs hatch into crawlers from late June to early July.

**Control Measures:** A dormant-oil spray may be applied before growth of the tree starts in the spring to kill the immature scales. Summer sprays may be applied most any time the scales are present. However, the crawlers are much more susceptible to insecticide. To control the crawlers, a spray may be applied from mid to late June.



Closeup of mature Pine Tortoise Scale females



Black Sooty Mold growing on honeydew

## PINE TUBE MOTH

*Argyrotaenis pinatubana* (Kft.)

**Description:** The pine tube moth adult is a small, slender, grayish moth with a wing-spread of about 14 mm. The forewings have broad, orange to reddish ochre-

ous patches and are crossed by two whitish, oblique lines.

**Hosts:** A number of conifers, but white pine seems to be preferred.

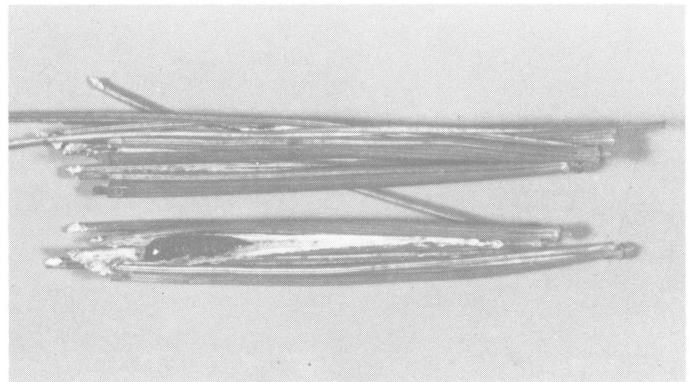
**Injury:** Larvae fasten from 5-20 needles into a tube with silk. They live inside the tubes and feed on the tips of the needles. Infested trees look ragged.

**Life cycle:** The pine tube moth spends the winter as a pupa inside the tube of needles. Adults appear in April and lay eggs on the needles in May. Two generations are produced each year.

**Control Measures:** Sprays to control the pine tube moth should be applied in early May for the first generation and again in mid July for the second generation.



Old female scales and young nymphs



Pine Tube Moth larva and tubes



## PINE WEBWORM

*Tetralopha robustella* Zeller

**Description:** The adult moth has a wing-spread of about 25 mm. The basal part of the forewing is purplish-black, the center part grayish, and the outer part blackish. Full-grown larvae are yellowish-brown with two dark-brown longitudinal stripes on each side. They are about 18 mm long.

**Hosts:** Many species of pines including white pine and Scotch pine.

**Injury:** Injury is caused by the young larvae mining the needles and the older larvae eating entire needles. Nests are very unsightly and reduce the quality of the tree.

**Life Cycle:** The pine webworm overwinters as a larva in a cocoon in the soil under its host. In early June, adults appear and mate. Eggs are laid in rows on the needles in early July. Larvae appear from mid July to mid August. Young larvae lay down a fine meshwork of silk strands among the needles. They enter and mine the needles. Frass is pushed out the entrance hole and piles up in a continually growing mound of pellets. As many as 80 larvae may be found in or close to a pellet mass. Older larvae form silken tubes covered with frass pellets as far as 6 inches away from the main mass. By mid September some of the larvae drop from the trees and enter the soil to form their cocoons and overwinter. One generation occurs each year and possibly a second.

**Control measures:** To control the webworm, sprays may be applied about mid July and again in mid August, if frass masses appear to be enlarging or new ones have formed. Since larvae stay close to the frass mass, these may be pruned out and destroyed as they appear.



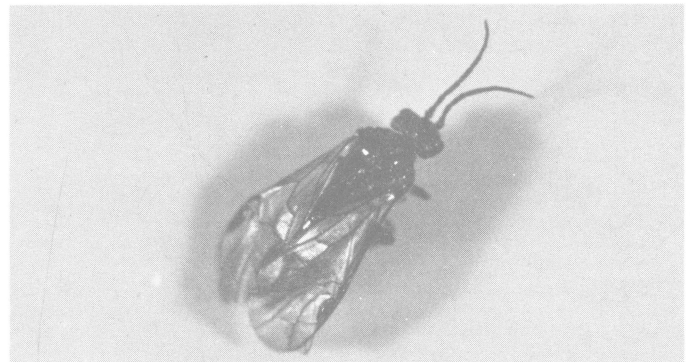
Pine Webworm nest

## SAWFLIES (on conifers)

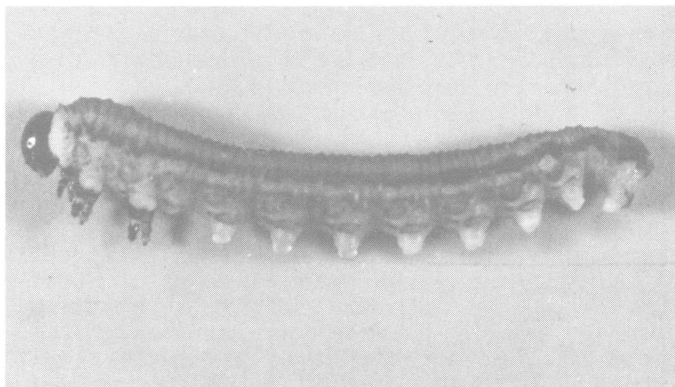
(Family Diprionidae)

**Description:** The term "sawfly" applies to a group of insects that resembles small wasps as adults and are caterpillar-like in the larval stage. They get their name from the saw-like ovipositor (egg laying device) of the females. Sawfly larvae can be distinguished from regular caterpillars by the presence of 5 or more pairs of fleshy legs on the lower part of the body (prolegs) and by having a single pair of eyes (ocelli). Nearly all the species that are troublesome on Christmas trees belong to the Family Diprionidae, the conifer sawflies. Most of the larvae are from 15-25 mm long, gray-green or dusky in color and have prominent stripes or spots. (See the chart on next page for details.)

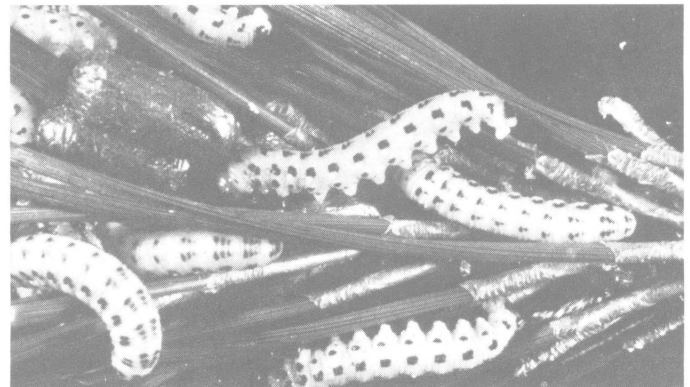
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Typical Sawfly adult

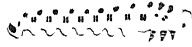
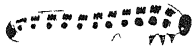
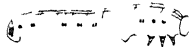





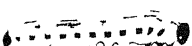




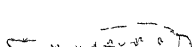



European Pine Sawfly larva —note number of fleshy prolegs



Red Headed Pine Sawfly larvae

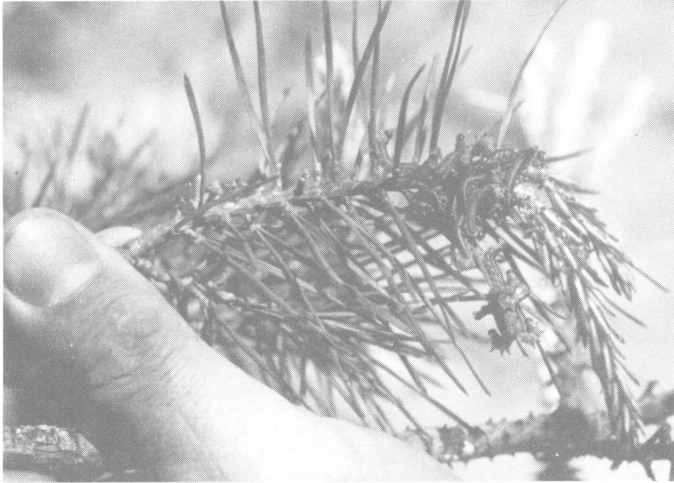
## SAWFLIES ON CONIFERS

SPECIES	FULLY GROWN LARVAE	PRINCIPAL HOSTS	LARVAL FEEDING PERIOD					FEEDING HABITS	OVERWINTERING STAGE & LOCATION
			May	June	July	Aug	Sep		
Red-headed pine sawfly		Jack pine Red pine Scotch pine	[Solid black bar from May to Sep]					Colonies, old foliage and tender bark	Cocoon in topsoil or duff
White pine sawfly		White pine	[Solid black bar from May to Sep]					Colonies, old and current foliage	Cocoon in topsoil
Swaine jack pine sawfly		Jack pine			[Solid black bar from July to Aug]			Colonies, old foliage primarily	Cocoon in topsoil
Introduced pine sawfly		White pine Jack pine	[Solid black bar from May to Sep]					Singly, old and current foliage	Cocoon on twigs or in duff
Red pine sawfly		Red pine Jack pine		[Solid black bar from May to June]				Colonies, old foliage only	Eggs in slits in needles
European pine sawfly		Red pine Jack pine Scotch pine		[Solid black bar from May to June]				Colonies, old foliage only	Eggs in slits in needles
Jack pine sawfly		Jack pine Red pine		[Solid black bar from May to June]				Colonies, old foliage only	Eggs in slits in needles
Balsam-fir sawfly		Balsam fir Spruces		[Solid black bar from May to June]				Colonies	Eggs in slits in needles
A pine sawfly		Jack pine			[Solid black bar from July to Aug]			Colonies	Cocoon in the duff
A pine sawfly		Red pine Scotch pine		[Solid black bar from May to Sep]				Singly, old and current foliage	Cocoon on twigs or in duff
European spruce sawfly		Spruces	[Solid black bar from May to Sep]					Singly, old foliage preferred but may eat current	Cocoon in topsoil or duff
Yellow-headed spruce sawfly		Spruces		[Solid black bar from June to July]				Semi-colonial prefer old foliage first	Cocoon in soil
Larch sawfly		Larches (Tamarack)		[Solid black bar from May to Sep]				Colonies	Cocoon in duff
Pine false webworm		Red pine White pine		[Solid black bar from May to June]				Colonies, inside nest of webbed frass pellets	Larvae in cells in ground
Nesting pine sawfly		Jack pine Red pine			[Solid black bar from July to Aug]			Singly, inside nest of webbed frass pellets	Larvae in cells in ground

## Sawflies — continued

**Hosts:** Most species of pines.

**Injury:** Sawflies are early season gregarious feeders and, as a rule, prefer the older needles. They can be found in large groups on a branch devouring all the needles. Small trees may be completely defoliated

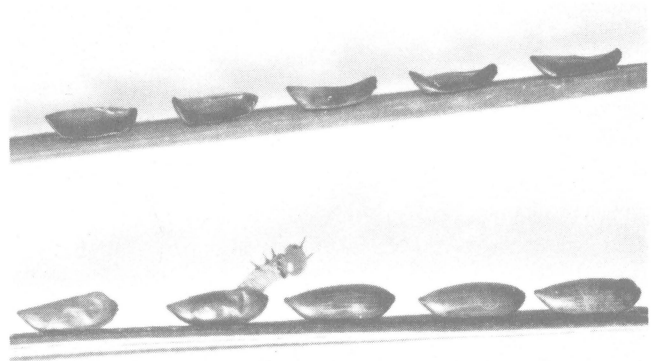


Cluster of young sawflies and defoliated twigs

from the top down. When a tree is defoliated, the sawflies move to neighboring trees.

**Life Cycle:** Most sawflies are similar in their life histories and habits. Details are provided in the chart on page 16.

**Control Measures:** Sawflies are not difficult to control with a spray applied to the needles on which they are feeding. The chart will help one to know when the larvae of the various species are feeding. Frequent inspections are important to detect a sawfly infestation before severe defoliation of the needles takes place.



Eggs of nesting pine sawfly on White pine needles—note one egg hatching

## SPOTTED PINE APHID *Eulachnus agilis* (Kaltenbach)

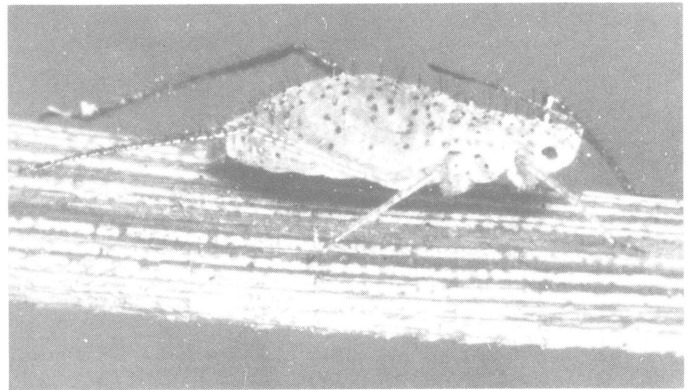
**Description:** This aphid is rather narrow, elongate, has long hindlegs, and is a gray-green color. The body and legs are covered with numerous short hairs and small black spots. The aphid is very active; often moves rapidly when disturbed.

**Hosts:** Scotch pine is the favored host, but red pine is sometimes attacked.

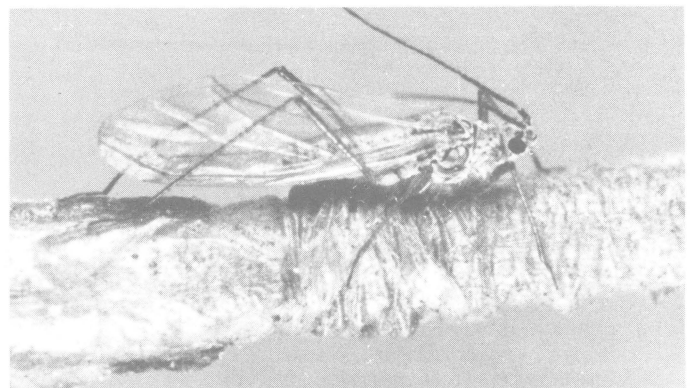
**Injury:** Injury is caused by the aphids sucking sap from the needles. Infested needles gradually yellow, eventually turn brown and drop prematurely. Usually, only second and third year needles are attacked. Most damage shows up during peak aphid populations, which is in early May and again in early October.

**Life Cycle:** The spotted pine aphid overwinters as an egg on the current year's needles. Spring egg hatch leads to the first population peak in late May. During summer months, while temperatures are high, populations tend to drop off until early August. By October 1, they have built up to an even greater peak. Winged migrant females also begin to appear during this second buildup. During October, winged male forms appear and aphid numbers gradually decrease. Mating and egg laying occur well into late fall.

**Control Measures:** Aphids may be controlled any time they are on the trees. However, waiting too long, may result in damage to the needles. Sprays probably will be needed in early May when the overwintering eggs hatch. The summer population should begin to build-up in September, so periodic examinations of the trees at this time will detect an aphid buildup. Sprays should be applied as needed.



Wingless Spotted Pine Aphid



Winged Spotted Pine Aphid

## SPRUCE NEEDLE MINER

*Taniva albolineana* (Kft.)

**Description:** The adult is a small, dark-brown moth with a wing-span of about 12 mm. The front wings are crossed by 3 irregular grayish bands. Larvae are small, brown caterpillars that reach a length of about 6 mm when full-grown.

**Hosts:** Norway, Engelmann, and Colorado spruce.

**Injury:** Damage is caused by the larvae mining, cutting-off, and webbing together old needles. The heaviest injury is found near the interior portion of the lower branches. Infestations can best be detected by parting the lower branches and looking for webbed masses of dead needles and frass. This type of injury will greatly reduce the esthetic value of the trees and, at times, results in defoliation. The spruce needle miner is more often a problem in ornamental plantings than in forested areas.

**Life Cycle:** The spruce needle miner overwinters as a larva inside a hollowed-out needle. The larvae feed for a short time in the spring and by mid April pupate within silken cocoons inside nests formed during the previous season. Adults emerge from mid May to mid June. Pale-green eggs are deposited in a shingle-like fashion in groups of 3-12 on the undersides of old needles. Upon hatching, young larvae bore into the base of the needles and begin hollowing-out the interior. Several larvae may be found within the same needle. As the larvae continue to feed and grow, the mined needles are cut off at their base and webbed together, forming a nest-like structure. Following the first frost, each larva enters a hollow needle, webs over the opening, and spends the winter there. There is only one generation per year.

**Control Measures:** Overwintering larvae may be difficult to reach with a spray in early April when they resume feeding inside the needles. Sprays should be applied in early to late June to control newly hatched larvae. Some eggs may still be hatching in late June, so a spray at that time might be profitable.



Spruce Needle Miner nest on Colorado Spruce



Closeup of nest showing webbed needles and frass

## SPRUCE SPIDER MITE

*Olegonychus ununguis* (Jacobi)

**Description:** These mites are too small to see without the aid of magnification. On a white piece of paper, they appear as dark green to dark brown oval specks.

**Hosts:** Spruce, arborvitae, juniper, hemlock, pine, Douglas fir, and larch.

**Injury:** Spruce spider mites suck sap and remove the green chlorophyll from the needles. This results in a yellow-stippling of the needles. A severe mite infestation may cause needles to turn brown and fall off. Strands of webbing may be found on the needles, too.

**Life History:** The mite overwinters as an orange-colored egg on the needles and twigs of the host plant. The eggs hatch in early spring. Feeding and reproduction continue throughout the summer and a generation of mites may be produced in only 17 days.

**Control Measures:** Cool, humid and rainy weather tends to prevent the buildup of this mite. Hot, dry weather favors it. If tree needles take on an off-green



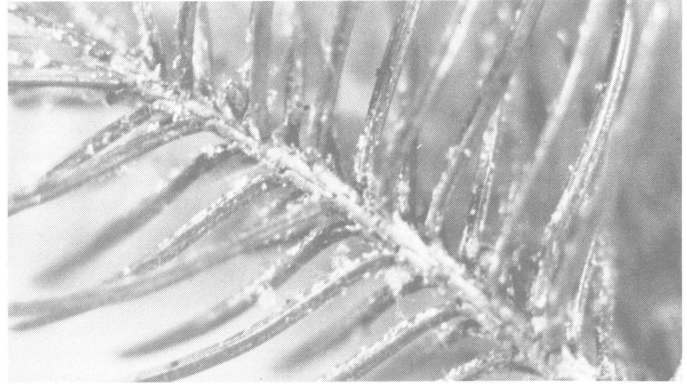
Spruce Spider Mite feeding damage to old Hemlock needles

(continued next page)



color in early spring and summer, suspect spruce mites and check for them. To do this, place a white piece of paper under a branch and strike the branch against it. This should dislodge the mites, which appear as tiny, dark specks moving on the paper.

To control the mites, a dormant oil spray may be applied before growth starts in the spring. Foliage sprays may be applied as mite numbers and/or feeding damage show up. With foliar sprays, apply 2 applications spaced about 14 days apart and repeat as needed, unless the label instructs differently. Two side-by-side sprays are usually needed as most miticides do not kill the eggs. These surviving eggs will hatch and an infestation could buildup rapidly.



Spruce Spider Mite webbing and cast skins

## WHITE-PINE APHID

*Cinara strobi* (Fitch)

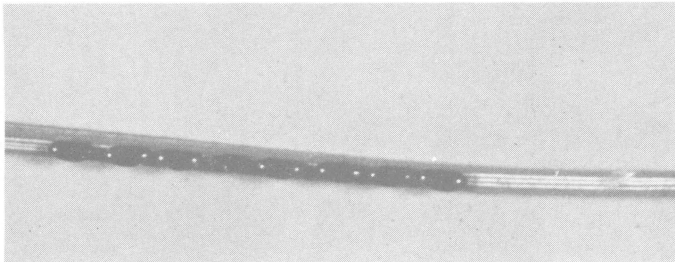
**Description:** The winged form of the white-pine aphid is a shiny, dark-brown insect about 1/4-inch long. It has a white stripe down the middle of its back, white powdery spots on the sides, and long stiff hairs on its body.

**Hosts:** White pine.

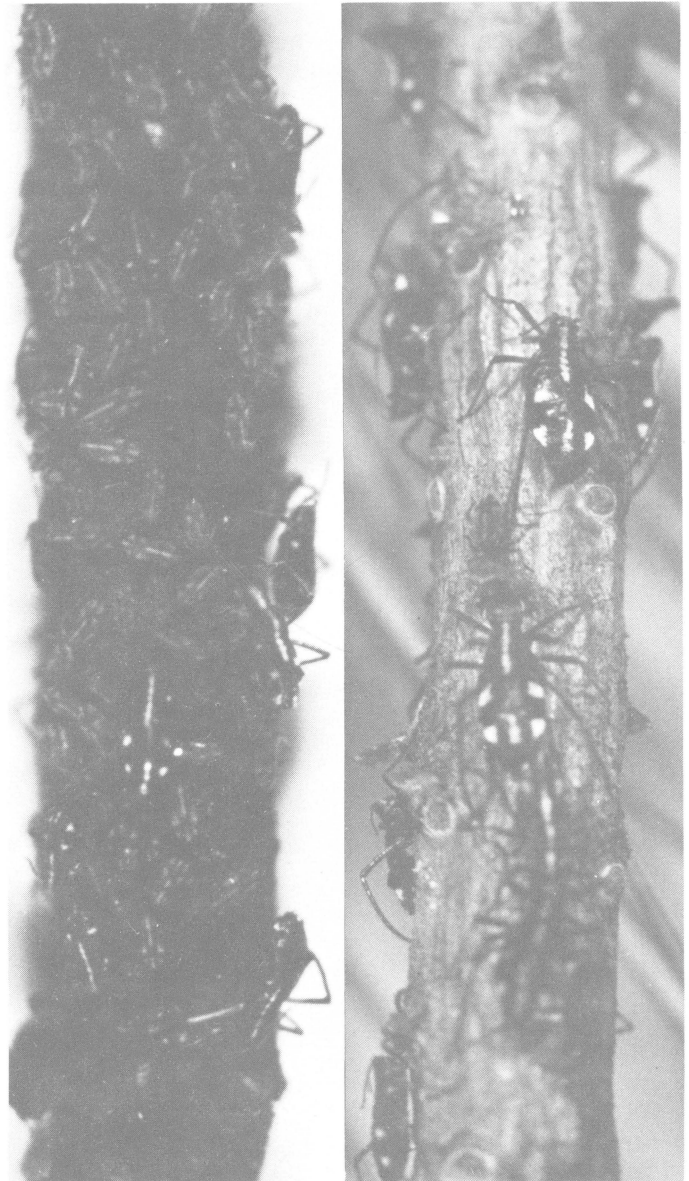
**Injury:** Young trees or branches of larger trees may be killed or severely stunted as a result of feeding by a large population of white pine aphids. Large quantities of honeydew (a sweet liquid) are secreted by the feeding aphids that collect on the bark and the foliage. A black sooty mold grows on the honeydew. This mold looks unsightly, interferes with normal growth, and reduces tree quality.

**Life Cycle:** The insect overwinters as an egg on the needles of white pine. Several eggs may be seen lined up in a row. The eggs hatch in the spring into wingless females that produce living young. Aphids live together in colonies on the twigs. Several generations of aphids are produced in the summer. Toward fall both male and female winged forms are produced, mating takes place and eggs are laid. These eggs overwinter and start the colony in the spring.

**Control Measures:** A dormant oil spray may be applied in the spring before growth starts to smother the overwintering eggs. Even though an oil spray is applied, some eggs may be missed and a foliar spray will likely be needed in June. A visual inspection should be made in May to determine the aphid population and if control measures are needed. At this time, it may be possible to spot treat only infested trees and not the entire plantation. Additional inspections should be made in mid-summer and in late summer when winged forms begin to migrate. Treatment should be applied as the population builds up.



White Pine Aphid eggs on needle



Left, White Pine Aphids on twig  
Right, Spotted Pine Aphids on twig

# WHITE PINE WEEVIL

*Pissodes strobi* (Peck)

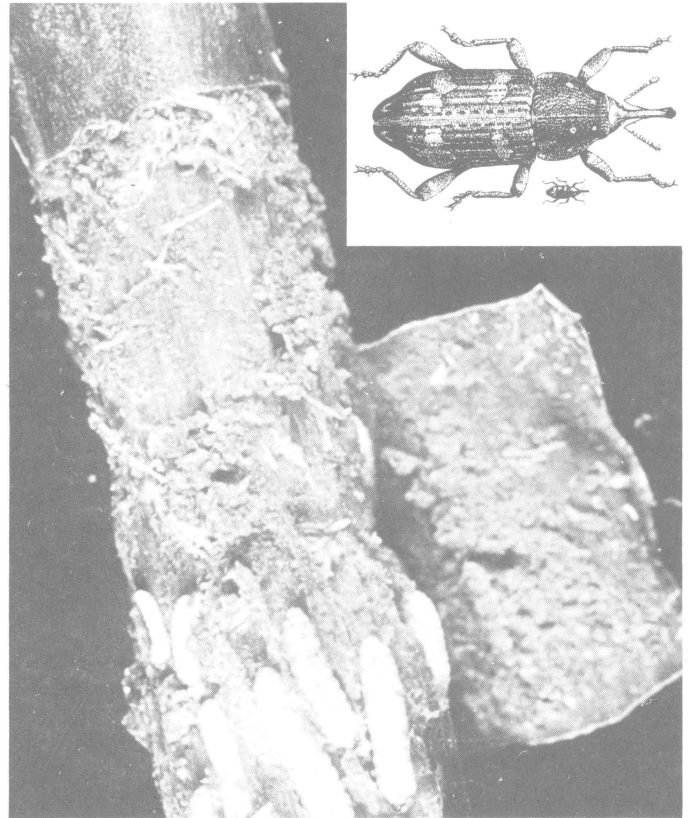
**Description:** The adult weevil is an elongate, brownish snout beetle about one-fifth of an inch long marked with irregular small patches of grayish-white and yellow scales. Larvae are white, cylindrical and legless.

**Hosts:** White pine, Norway spruce, Jack pine, Scotch pine, Mugho pine, red pine, and red spruce.

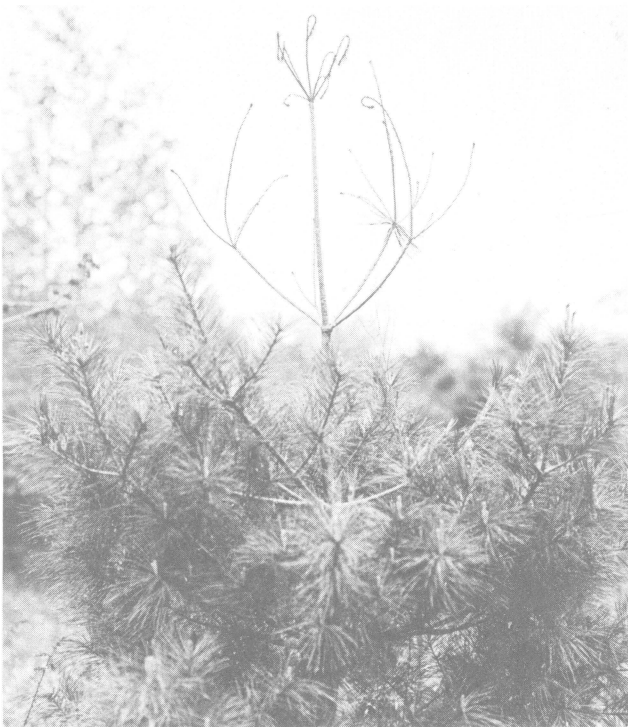
**Injury:** White pine weevil larvae feed in the tree leaders and cause them to wilt, turn brown and die. Lateral branches in a whorl below the dead leaders assumes the role of leader and this results in a crook in the main stem. Sometimes two or more laterals will compete for leadership and a forked tree results. Infested trees are reduced in quality. First evidence of adult feeding on terminal leaders in the spring is the appearance of tiny drops of resin exuding from holes made by the adults.

**Life Cycle:** The weevil overwinters as an adult in litter under the trees. Weevils come out of hibernation in March and begin feeding on the leaders. Eggs are laid in small punctures in the bark of the leader and hatch in about a week. The grubs, boring downward in a ring, feed on the inner bark and the outer surface of the wood. This girdles and kills the leader. In late July, larvae become full-grown and change to the pupae and adults. Adult weevils emerge from late July until early fall. There is only one generation per year.

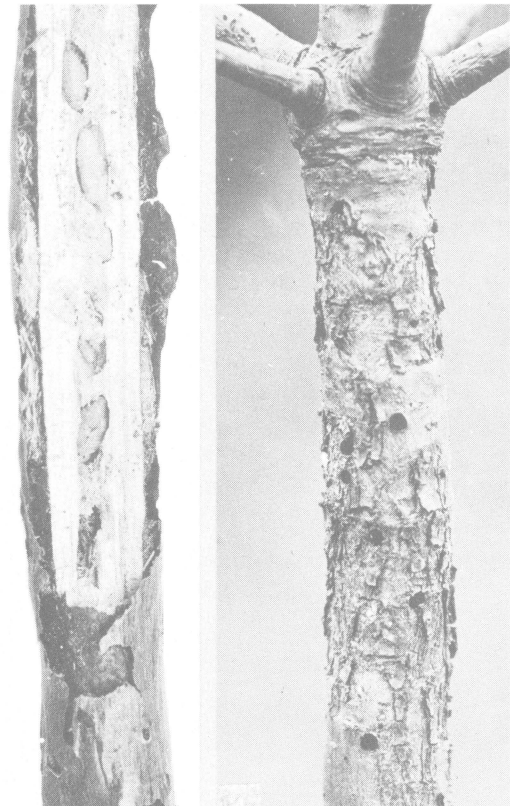
**Control Measures:** Control measures are directed at the adults. A spray should be applied to the leaders about mid March through April for adults coming out of hibernation. A fall treatment may be applied from mid September to October for control of newly emerged adults.



Bark of terminal removed to show White Pine Weevil larvae—Inset, White Pine Weevil adult



Typical White Pine Weevil damage to terminal growth



Pupa in cutaway—Adult emergence holes

## YELLOW BELLIED SAPSUCKER

*Sphyrapicus varius varius*

**Description:** The yellow bellied sapsucker is a medium-sized woodpecker about 8-8½-inch long. The adult has bands of red, black, and white on the head. The belly is yellow, back black and white, and wings have a rather broad white band.

**Hosts:** Scotch pine, Austrian pine, and other trees. It prefers to nest in poplar or birch.

**Habits and Injury:** This sapsucker is primarily a forest or woodlot bird that likes to be near water and open spaces. It eats the nutritious inner bark of trees. In doing so it makes a series of small, evenly spaced pits. It is these holes that cause damage to Christmas trees.

Scotch pine is hardest hit and may be killed. Sap fills the holes. Insects are attracted to this sap and become stuck in the bleeding sap. The sapsucker feeds on both the insects and the sap. It also feeds on the fruits of trees and shrubs in fall and winter months. Its brush-like tongue is not adapted for normal woodpecker-type feeding.

**Control:** There is no practical way to keep this woodpecker from pecking holes in Christmas trees other than by eliminating the bird itself. An application of a two-inch band of tree tanglefoot just below the newly made row of holes has discouraged the Sapsucker.



Holes pecked in Scotch Pine by Yellow Bellied Sapsucker



## ZIMMERMAN PINE MOTH

*Dioryctria zimmermani* (Grote)

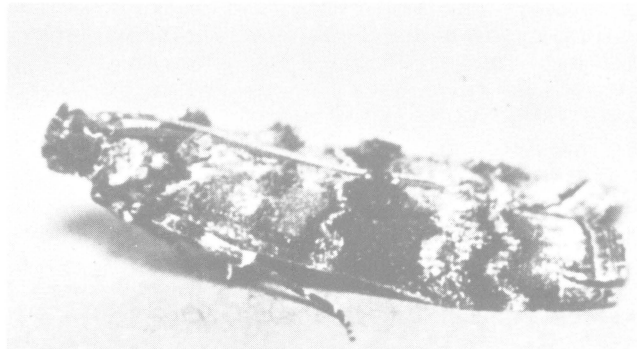
**Description:** Full-grown larvae reach a length of about 18 mm and vary in color from pink to greenish. The body is covered with small blackish tubercles, each bearing a single black bristle. The head is reddish-brown. Adults are small to moderate-sized moths, rather gray in color, and have a pair of zig-zag markings on the front wings.

**Hosts:** Most pines are subject to attack, but Scotch and Austrian pine are preferred.

**Injury:** The injury is caused by boring or tunneling of the larvae within the cambial area of the wood. Both the terminals and main stem are attacked. Dead tops and hanging branches are evidence of attack to the terminals. If terminals do not bend or break at the point of injury they may become "fish-hooked" in shape and turn an off-color. Main stem injury can be detected by the presence of burl-like growths above the tunneled areas or by the formation of pitch masses on the trunk. Host trees are often reinfested year after year.

**Life Cycle:** This insect overwinters as a young larva in bark crevices on the tree. Larvae become active in early April to early May at which time they begin tunneling in the new growth. Later, they attack the whorl and main stems. Pupation occurs within the tunneled areas, or in resin masses. Adults emerge in mid to late summer, followed by mating and egg laying. Eggs hatch into larvae that overwinter. Little or no feeding occurs before hibernation.

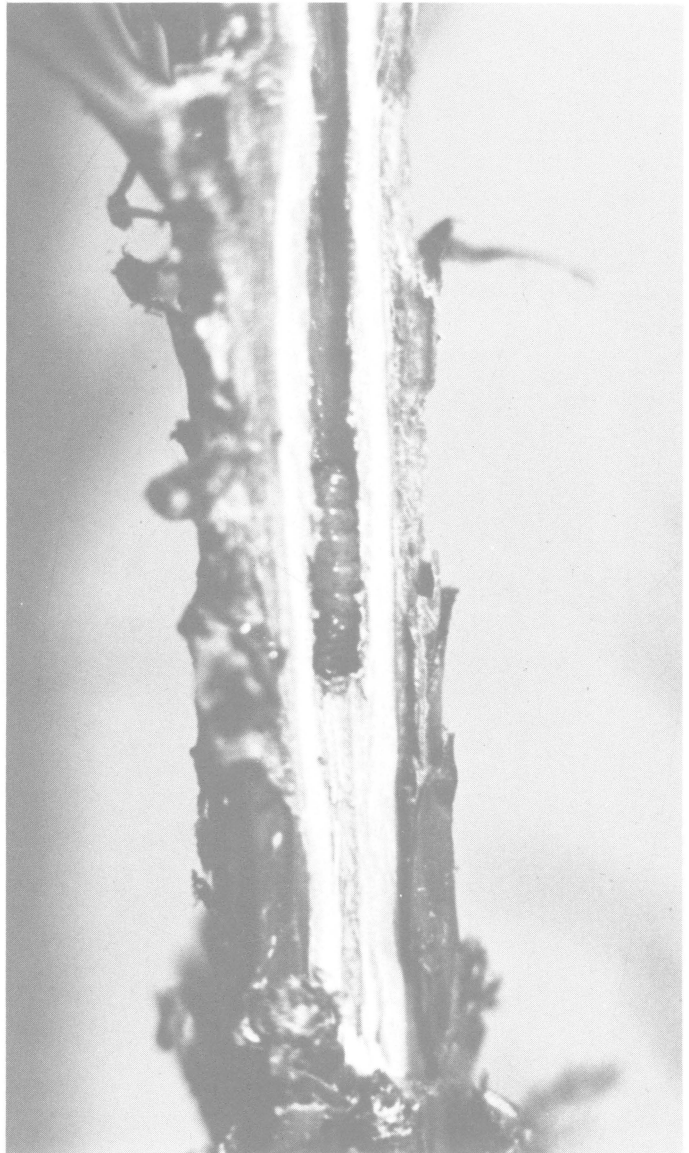
**Control Measures:** Good control of this species depends upon killing the emerging larvae in the spring before they are able to penetrate the bark and begin tunneling. Sprays should be applied from early April to early May. Control of the larvae in the fall has been less successful, because the larvae do little feeding and because they are protected by the covering of the cocoon.



Zimmerman Pine Moth adult



Leader injured by Zimmerman Pine Moth



Zimmerman Pine Moth larvae in twig



## OHIO POISON INFORMATION CENTERS

**AKRON. 44308**

Children s Hospital, W Buchtel and W Bowery  
PHONE 216-379-8562

**CANTON: 44710**

Poison Information Center ( Information only )  
Aultman Hospital  
2600 6th St , SW  
PHONE 216-452-9911 (Poison Control Center)

**CINCINNATI: 45267**

General Hospital 234 Goodman St  
PHONE 513-872-5111

**CLEVELAND 44106**

Cleveland Academy of Medicine, 10525 Carnegie Ave  
PHONE 216-231-4455 ( Emergency )  
231-3500 ( Office )

**COLUMBUS 43205**

Children's Hospital 561 S 17th St at Livingston Park  
PHONE 614-258-1323

**DAYTON: 45433**

USAF Hospital Wright Patterson Air Force Base  
PHONE 513-257-2969

**LORAIN 44053**

Lorain Community Hospital  
3700 Kolbe Rd  
PHONE 216-282-2220

**MANSFIELD: 44903**

Mansfield General Hospital, 335 Glessner Ave  
PHONE 419-522-3411, Ext 545

**SPRINGFIELD: 45502**

The Community Hospital, E High St and Burnett Rd  
PHONE 513-325-0531

**TOLEDO: 43609**

MCOT, 2025 Arlington Ave  
PHONE 419-381-3897

**YOUNGSTOWN 44505**

St Elizabeth Hospital, 1044 Belmont Ave  
PHONE 216-746-2222, Ext 554

For emergency consultation, physicians or hospital representatives may also call U S Environmental Protection Agency, 4770 Bulford Highway, Chamblee, Georgia 30341 Phone Office 404-633-3311, Ext 5211