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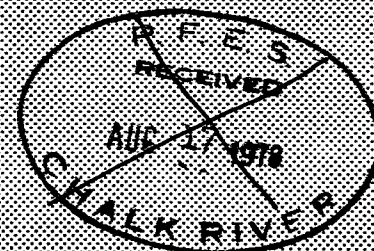
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TROUBLE with TREES

AN ALMANAC
OF SHADE
TREE PESTS
IN THE MARITIMES

by
T. Renault
and
D. Marks



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no. 90

MARITIMES FOREST RESEARCH CENTRE

The Maritimes Forest Research Centre (MFRC) is one of six regional establishments of the Canadian Forestry Service, within Environment Canada. The Centre conducts a program of work directed toward the solution of major forestry problems and the development of more effective forest management techniques for use in the Maritime Provinces.

The program consists of two major elements - research and development, and technical and information services. Most research and development work is undertaken in direct response to the needs of forest management agencies, with the aim of improving the protection, growth, and value of the region's forest resource for a variety of consumptive and non-consumptive uses; studies are often carried out jointly with provincial governments and industry. The Centre's technical and information services are designed to bring research results to the attention of potential users, to demonstrate new and improved forest management techniques, to assist management agencies in solving day-to-day problems, and to keep the public fully informed on the work of the Maritimes Forest Research Centre.

AN ALMANAC OF SHADE TREE PESTS IN THE MARITIMES

by

T. Renault and D. Marks

Maritimes Forest Research Centre

Fredericton, New Brunswick

Information Report M-X-90

Canadian Forestry Service

Department of Fisheries and the Environment

1978

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This almanac* is for the owner of ornamental trees and shrubs. It is a harbinger of spring, when along with the approaching pleasures of spring and summer, come the demons of insects and plant diseases.

It is easy reading for the uneasy householder.

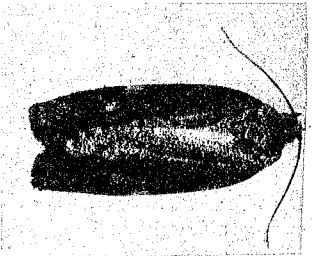
It is a prerequisite to reading our more detailed pamphlets on control of insect pests and diseases, available by writing to th

Maritimes Forest Research Centre
Department of Fisheries and the Environment
P. O. Box 4000
Fredericton, New Brunswick E3B 5P7

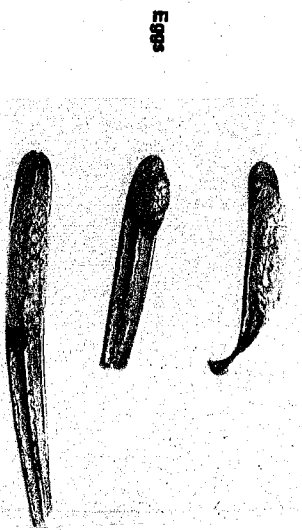
or

P. O. Box 667
Truro, Nova Scotia B2N 5E5

* Based on a newspaper column, "Trouble With Trees", which appeared in Maritime newspapers in 1977.



Spruce budworm moth



Eggs



Small larva in webbing

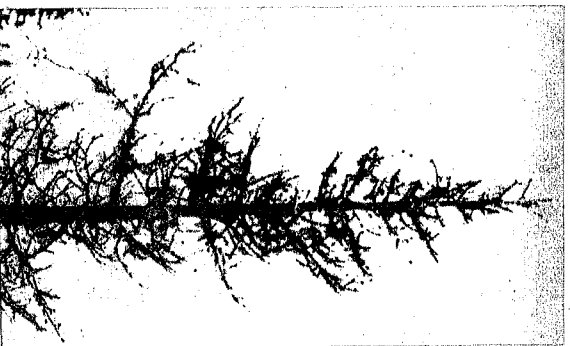


Large larva



Pupae

Defoliated tree



Spring is here and the pest problems that plague ornamental and shade tree owners will soon appear. Already pest control firms and government agencies are receiving numerous requests for information on pest control. Through this biweekly column we hope to alert you to some of the insects and diseases that you might find on your trees and to tell you what you can do about them.

It is only occasionally that trees in towns and cities are overrun by a scourge of insects. However, trees along our roads and streets and in our yards are nevertheless susceptible to damaging attacks from many species of insects and diseases. It is the isolation of such trees that make them prime targets particularly if they have been weakened by vandalism and other mechanical injuries. Outbreaks of cankerworms, tent caterpillars, tussock moths, or other defoliators may cause heavy damage for two or three years, but generally it is the persistent attacks by a few insects and diseases of about a dozen species that cause concern.

Spruce Budworm

The top spot on the pest parade is still occupied by the spruce budworm. Normally a defoliator of forest trees, it has spread to urban areas following an almost catastrophic increase in numbers in the Maritimes forests, and urban dwellers are now finding it necessary to protect their ornamental softwoods. Last year, some owners of blue spruce watched their small trees turn, virtually overnight, from a healthy blue-green to a drab reddish brown. Although the injury from budworm larvae feeding may not always be serious, it disfigures the tree and the masses of brown chewed-up needles are cause for alarm.



TROUBLE WITH TREES

IN

MAY

In early May, the minute larvae are just becoming visible to the untrained eye following their emergence from sheltered sites on the twigs and branches where they have been hibernating since last August. Winter normally takes a very heavy toll of these overwintering caterpillars and survivors that have just emerged will be exposed to predation by various insects, spiders, and other organisms before they can find and establish themselves in a feeding site. When they first emerge, they seem to wander aimlessly until they choose an old needle which they mine for several days. From there, the larvae move to an unopened bud, penetrate it, and begin feeding on new foliage until the latter part of June.

The spruce budworm can be controlled on ornamentals with biological or chemical insecticides if the application is properly timed. Sprays

will give inadequate control if applied while the larvae is still protected within the needle or unopened bud. As the buds develop and the new needles start to flare in early June, the budworm is no longer sheltered within its feeding site and it is vulnerable to relatively small amounts of pesticides.

Dylox, Cygon, Sevin, Malathion, and Dipel (Thuricide) are the recommended insecticides. The first four are poisons and must be handled with care. READ THE DIRECTIONS ON THE LABEL. The latter is a bacterial compound that has no ill effects on beneficial insects or the environment.

Two leaflets describing, in more detail, the control of spruce budworm on ornamentals and in Christmas tree plantations are available in English or French.

Galls of Hardwood

The spruce budworm and other defoliators such as maple leaf rollers, cankerworms, etc., have done most of their damage, but now we notice little bumps or galls forming on hardwood leaves. These swellings, especially those on maple, are often mistaken for the symptoms of a serious tree disease. Some are wart-shaped, some spindle-formed or blister-like, and others appear as a velvety green-red growth on the upper surface of the leaves. However, they seldom seriously affect the health of the tree. Most galls or tumors are caused by the feeding punctures of tiny mites, too small to be seen with the naked eye. As the gall grows, a cavity forms inside it and literally entombs the feeding mite. The abundance of galls varies greatly on different trees, on different parts of the same tree, and from year to year. Nearly every leaf of small trees may bear galls while the foliage of larger trees may be heavily infested only on the lower branches. Control measures may be desired to improve the appearance of severely infected prized ornamentals. Spray with miticides such as Kelthane, Genite, Malathion, and Guthion. For better results treatments should be applied in late April or early May when the buds first show green.

Spruce Spider Mite

An enemy of ornamental evergreens, belonging to the same group of pests just described, is the spruce spider mite. Warm, dry weather at this time of year greatly increases the danger of destructive infestations. This mite occurs on

several species of coniferous trees, but spruce, cedar, and hemlock ornamentals are most likely to be attacked in the Maritimes Region. The foliage at first looks dusty and dingy yellow, but later turns reddish-brown. Many of the needles eventually drop. Tangled webbing between the needles is an unmistakable sign of high mite populations. Further evidence of infestations can be obtained by shaking the foliage over a piece of white paper; dislodged spider mites appear on the paper as tiny, green or brownish spots scurrying about. Damage will vary, depending on the condition of the host plant. Trees are killed only by severe attacks. Trees growing in poor soils or without adequate care suffer most from this pest, especially during droughts. Young nursery stock and newly planted trees may also be seriously

affected. Spider mites feed into September. Heavy rains and prolonged high humidities help to keep numbers down. Infestations can be retarded by thoroughly washing the trees every few days with a strong stream of water from a garden hose; this breaks up the webbing which protects the eggs and young. More effective control can be obtained by spraying infested trees with those miticides recommended against gall mites.

Lilac Leaf Miner

Also of concern, are those brown wrinkled and curled leaves so commonly observed in mid-summer on lilacs. This damage is the work of the lilac leaf miner. When abundant, this insect can greatly mar the appearance of lilac hedges and



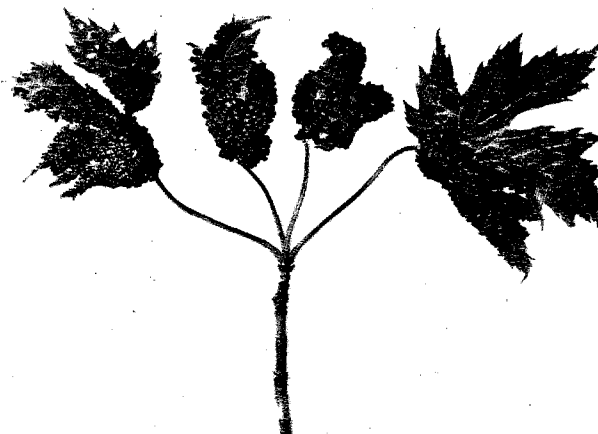
TROUBLE WITH TREES

IN

JUNE

shrubs. The tiny moths emerge from the ground around the end of May and lay their eggs on the developing lilac leaves. Larvae hatch and burrow into the leaves where the mines appear as large black blotches. After a couple of weeks the larvae exit from the leaves, roll them, and continue feeding inside the roll for another week or two. They then drop to the ground and within two weeks a second generation of moths appear and the life cycle is repeated. Feeding by the second generation continues into September. If infestations are light, control of these leaf miners can be attained by picking both the mined and the curled leaves and burning them. The larvae are difficult to kill because of their sheltered locations between the upper and lower surfaces of the leaves. Systemic insecticides, those that are absorbed into the plant making it poisonous when eaten, should be used. For shrubs and hedges foliar treatments are the most practical. A first application should be made around the end of May, followed by a second application at the end of July (Diazinon, Malathion, and Cygon are suggested insecticides). If only a few large stems are involved, paint a 8-to 10-cm wide band of Cygon directly on the bark below the lowest branches.

FOLLOW DIRECTIONS ON LABELS CAREFULLY.



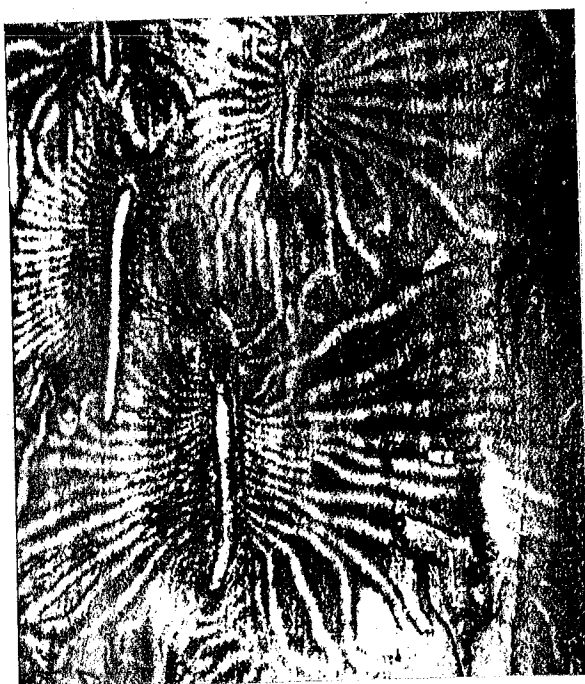
Galls caused by feeding mites



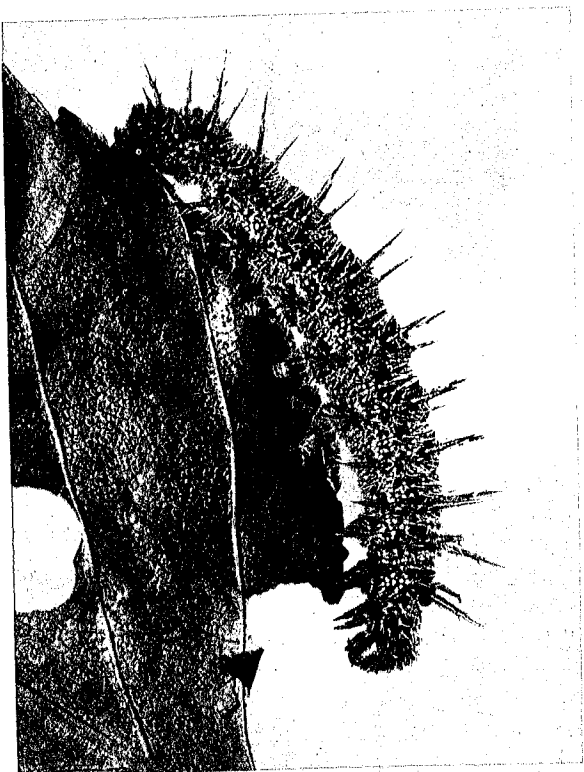
Curled leaves of lilac



Tree infected with Dutch Elm Disease



**Beetle galleries under
the bark of dead and
dying elms**



Spiny Elm Caterpillar

Dutch Elm Disease

Each year our concern over dead and dying elm trees is increasing as thousands of these beautiful trees are becoming standing derelicts along our roadsides and streets.

Dutch elm disease (DED) is found widely throughout eastern Canada. In the Maritimes, it has been found in New Brunswick and Nova Scotia but to date it has not been reported in Prince Edward Island. The disease is caused by a fungus carried by elm bark beetles which breed in the bark of dead and dying elms. The fungus develops in the sap-conducting vessels and plugs them. Where trees grow close together it is also transmitted by root grafts. Symptoms first appear from mid June to mid July. The leaves on one or more branches wilt, shrivel, and turn yellow or brown but usually remain on the tree.

To verify the presence of the disease, remove the suspect branches and examine the cut ends for a brown stain in the outer ring of wood. If the bark is peeled, the branch will show a pattern of brown streaks. Positive identification requires laboratory culturing. Each sample to be cultured should consist of at least six sections from various branches showing symptoms. Each section should have the bark intact, be from 1.3 to 3.8 cm in diameter and from 15 to 20 cm long. The sections should be wrapped in paper (not plastic) and labelled so that they can be identified with the tree from which they came. Include the name and address of the sender. Send the sample to Disease Identification, Maritimes Forest Research Centre, P.O. Box 4000, Fredericton, N.B.

There is yet no practical cure for DED but sanitation has reduced the incidence of disease in many municipalities. Sanitation is the

removal and destruction of all dead and dying trees and branches, in which the elm bark beetles breed. Spraying to kill the beetles is helpful if used in conjunction with sanitation. But Prevention is better than Cure.

Spiny Elm Caterpillar

They seem to come from nowhere; but suddenly there they are, groups of large black spiny caterpillars busily feeding on the foliage of small ornamental hardwoods. Conspicuous colonies of these spiny elm caterpillars feed on the leaves of one or two branches and devour them completely before moving to other branches on the tree. The mature larva is black with several rows of branched spines and a row of reddish spots on the back. The adult of this voracious caterpillar is the beautiful mourning cloak butterfly. Its purplish-brown wings have a broad yellow band on the outer edges and an



**TROUBLE
WITH
TREES**

IN

JULY

adjacent row of blue spots. It is one of the few butterflies that damages trees.

The insect overwinters as a butterfly, hidden in some nook or cranny of the host tree. It is on the wing early in the spring, and in late May the female starts depositing her eggs in bands around the small twigs.

Chemical control is seldom necessary as disease, parasites, and predators usually keep it at low levels. Nevertheless, it can cause considerable damage to small shade trees. Clusters of larvae on one or two branches can be removed or destroyed. However, if the caterpillars are numerous and scattered throughout the crown, sprays of Sevin (carbaryl) or Malathion may be used.

Pesticides must be handled with care and according to directions on the container because they are toxic if inhaled, absorbed through the skin, or swallowed.

Whitemarked Tussock Moth

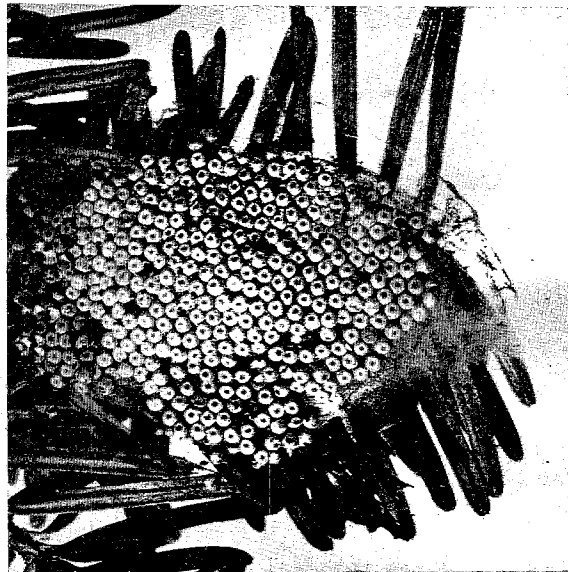
In some areas of New Brunswick and Nova Scotia, perhaps you have seen tens of thousands of invading enemies dropping on tiny silken parachutes. If so, these aggressors are the larvae of the whitemarked tussock moths, which have just recently hatched from overwintering eggs. It is a general feeder and will eat broad-leaved trees, evergreens, or almost any green crop, and cause a great deal of damage to blueberries. The young larvae are first found in late June and early July and appear only as minute pieces of harmless black fluff easily wafted aloft and dispersed by air currents.

The maturing caterpillar is characterized by a red head, two long black tufts of hair on each side of the head and one near its hind end, and four greyish brush-like tufts and two bright red spots on its back. The small caterpillars eat only the epidermis on the under sides of the leaves but as they grow they consume the entire leaf. When nearly full grown the caterpillars wander, often migrating to other trees or, if tree food supply is depleted, they drop and defoliate ground vegetation.

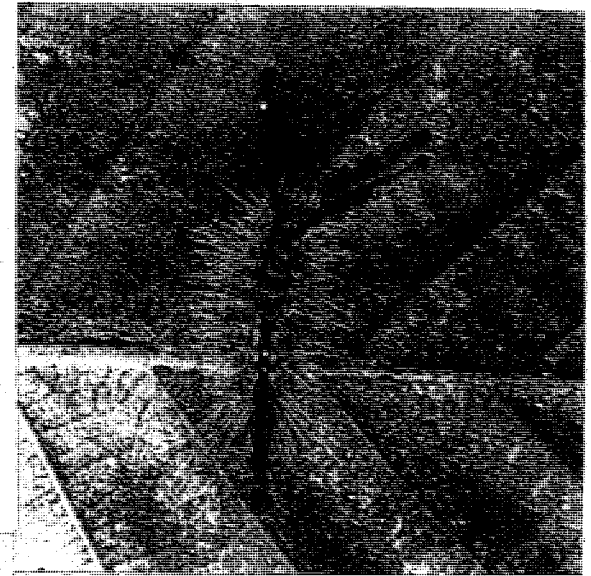
The insect feeds from 35 to 40 days, growing to about 38 mm. It spins a loose grey cocoon within which it transforms to a pupa. These cocoons are usually seen on tree trunks, but they are often observed on fences and on houses under shingles, siding, etc. The adults emerge from the pupal case in about 14 days, mate, and lay their eggs; thus completing the life cycle.

A tussock moth outbreak normally lasts from 2 to 4 years and is usually brought under control by natural factors, disease, parasites, or predators. Robins, Baltimore orioles, Bluejays, and English sparrows have been noted feeding on the small caterpillars. The larger larvae are probably not palatable to the bird predators. However, these natural controls usually are not sufficient to effectively check large populations of this insect. Outbreaks eventually collapse from a virus disease.

However, to prevent serious damage on ornamentals and other plants, the whitemarked tussock moth can be sprayed with Dylox.



Eggs laid by one Whitemarked Tussock Moth



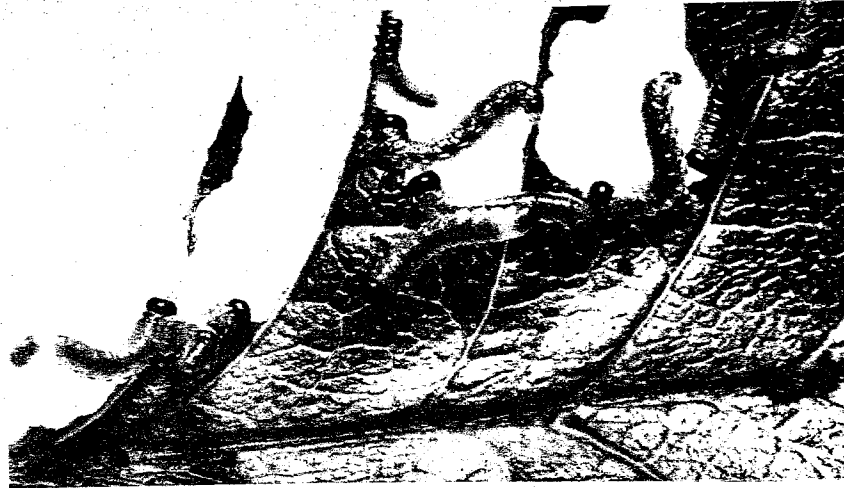
Whitemarked Tussock Moth larva

Aphids

Shade tree owners are now noticing leaf curling and foliage discoloration caused by a host of sap-sucking pests. This leaf damage is largely caused by soft-bodied aphids sometimes called plant lice which may frequent any part of the tree. Most trees are subject to attack although some seem more vulnerable than others. Aphids have a tremendous capability for reproduction largely due to rapid development and the many generations produced each year. Their importance as tree pests lies in the damaging effect that aphids have on plant tissues.

Generally, these plant lice cause one or more of the following kinds of injury, all of which tend to stress and disfigure the host trees: the development of galls, for example, spruce galls and rosettes or cockscomb galls of elm; the curling of leaves, particularly elm, resulting from attack by elm woolly aphid; drying of patches on the bark of tree stems, such as that caused by feeding of pine bark aphid; leaf damage such as discoloration or falling foliage; and the excretion of a sweet fluid, by the aphids, called honey dew which provides a medium for the growth of black sooty mold often noticed on elm, maple, pine, and other trees and plants.

Aphids are often held in check by heavy rains and cold temperatures. Lady beetles and other predaceous insects help to control infestations of aphids, but under conditions ideal for pest development, insecticides seem to be the only available alternative to preserve tree beauty, and under severe sustained feeding may be the only answer to plant survival. The chemicals



**Mountain-ash
Sawfly larvae**

Malathion and Sevin (carbaryl), used according to manufacturers directions, have proven to give satisfactory tree protection from aphid injury.

Mountain-Ash Sawfly

The leaves of mountain-ash or rowan trees, either the American or European species, are often voraciously consumed by an insect larvae termed the mountain-ash sawfly. This pest frequently strips the foliage from these shade trees but seldom kills them. These ornamentals are popular because of their beautiful foliage, fruit, and flowers.

The larvae of the mountain-ash sawfly is pale green when small and yellow with black spots when larger. They feed in colonies around the edges of the leaflets and ultimately consume

most or all of the leaflet except the midvein. They feed for 2 to 3 weeks and when full-grown (about 18 mm long), they crawl into the soil under the infested tree and most remain in a cocoon stage until the next spring. Adults then appear to lay eggs and repeat the cycle.

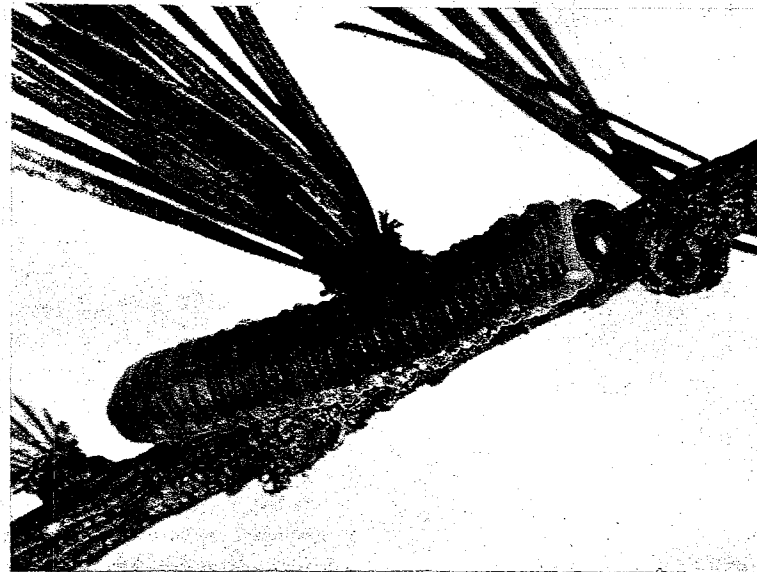
Mountain-ash trees should be checked carefully for small larvae during late June and through July to early August. If only a few colonies are present, the leaves bearing the larvae may be picked off and destroyed; spraying may not be necessary. If larvae are numerous, the trees should be sprayed as soon as possible. Malathion, Methoxychlor, and Sevin (carbaryl) are known to control this insect and keep the mountain-ash trees looking aesthetically beautiful.

Larch Sawfly

Severe outbreaks of the larch sawfly occur periodically on tamarack trees, often causing complete and widespread defoliation and sometimes considerable mortality. Both American and European larch are attacked. Outbreaks are generally more severe and cause greater damage in mature trees than in young trees. Shoots that are injured by egg-laying females will continue to grow, but they develop a characteristic curl or shepherd's which will remain for several years.

The adults emerge from cocoons in the ground between late May and late July. Eggs are laid in slits in current-year shoots, are translucent, and about 2 mm long. They hatch in about 7 to 10 days and the larvae feed in colonies, mostly on the needles of the older twigs. The fully-grown larva is about 25 mm long. The head is shiny black and the body is grayish green along the back and whitish beneath. Larvae feed for 3 to 4 weeks then drop to the ground, crawl into the soil, and spin a dark brown, capsule-shaped cocoon about 12 mm long. The overwintering insects remain in cocoons and become adults the next spring.

Individual or small groups of ornamental larch can be protected by spraying the foliage with Malathion. Always observe precautions on labeled containers of pesticides to avoid toxic effects to both plants and animals.



Larch Sawfly larva

Willow Blight

Two ornamental tree diseases are especially evident at this time of year, willow blight and leaf blotch of horse-chestnut. In the first of these, considered by many plant pathologists to be the most destructive disease of willows, parts of the crown often gives the definite impression of having been severely scorched by fire. Indeed the affected crown displays denuded branches covered with black soot-like patches (cankers). Trees severely infected with willow blight usually die if infection occurs for several consecutive years. The disease was introduced inadvertently to the Maritimes from Europe early in the century and now occurs extensively throughout the Region. It attacks willow leaves, twigs, and branches, causing defoliation, twig and branch cankers, and dieback. The first indication of willow blight is the appearance of dead areas on the leaves. Following this, the leaves may turn reddish brown or black. Infected leaves remain attached for a while but eventually wither and fall. As the disease progresses, young shoots are killed and cankers form on twigs and branches. Damage is generally most severe on the lower sections of the tree. The fungi responsible for willow blight overwinter in diseased twigs and branches and are spread by spores (seed-like bodies) during the spring and summer. Wet weather favors willow blight development and infection is usually most severe in the spring when leaves are young. All willow trees are hosts for the disease, but many of the native species are seldom attacked severely. A few introduced species such as the laurel or bay-leaved willow, *Salix pentandra*, have shown similar resistance.



TROUBLE WITH TREES

IN

AUGUST

This tree makes an attractive ornamental and should be considered when willows are to be planted. Since the fungi overwinter in diseased twigs and branches, this infectious material should be removed and destroyed while the trees are dormant. This will reduce the number of infections in early spring. However, one should remember that smaller trees seldom recover from repeated severe attacks. Healthy trees may be satisfactorily protected from willow blight by 3 or more applications of a protective spray (Ferbam, Captan, Bordeaux mixture) at 10-day to 2-week intervals, starting just before the leaf buds open in the spring. The number of applications should depend on weather, more being needed in prolonged wet seasons.

Leaf Blotch of Horse-Chestnut

The second of the important hardwood blights discussed in this column is known as

leaf blotch of horse-chestnut. It causes extensive leaf browning and occasionally prematurely defoliates this popular Maritime street tree. Severe infections which persist for several years promote low tree vigor and stunted growth. Infections of this common fungal disease appear in the spring as inconspicuous, water-soaked spots on the leaflets. By late June or early July, these spots enlarge and become reddish brown blotches usually surrounded by yellowish margins. Numerous black specks appear on the upper surface of the blotches. Curling of infected leaflets is common and occasionally petioles (leafstalks) are attacked. If infections are severe, trees appear scorched. These latter symptoms closely resemble those of Scorch, a common condition affecting many kinds of trees along city streets and attributed to heat, dryness, and polluted air. Leaf blotch is transmitted by spores produced on overwintered diseased leaves.

Air currents carry the spores to developing leaves, where they usually penetrate and infect leaf tissues during a rainy period. The black specks or blotches caused by early spring infections exude millions of summer spores, which spread by wind or rain and cause additional infections during rainy seasons. By August, a tree may have almost every leaflet infected and be extensively defoliated. To help reduce the incidence of leaf blotch, fallen leaves should be collected and burned in early autumn to eliminate the overwintering stage of the fungus. Fungicide sprays (Zineb, Captan, Ferbam), applied soon after buds open and followed by at least two applications at 10- to 14-day intervals may help prevent defoliation. Trees that have been defoliated for successive years should be given plant food to stimulate their vigor.

Pine Bark Aphid

One of the conditions, which most frequently concerns ornamental pine tree owners, is the presence of conspicuous white cottony masses on the trunks, branches, and the base of needles of white, Scotch, and Austrian pines. This waxy material is indicative of a colony of small (and often wingless) insects known as the pine bark aphid. Like willow blight and leaf blotch of horse-chestnut, pine bark aphids were accidentally introduced from Europe. They now occur in eastern Canada and most of the United States where the host trees grow. Heavily in-

festated trees have the appearance of having been whitewashed. Trees in parks and around dwellings, as well as small nursery stock, may be seriously injured by this pest. Larger trees growing in forested areas are seldom damaged. Injury is caused by the aphid sucking the sap, which reduces the vitality of the trees, often causing them to become stunted and bushy. There are at least three broods of pine bark aphids during the growing season. The insect overwinters as a mature wingless female at the base of the needle cluster or on the bark. Egg-laying begins after the weather warms up in May. The eggs hatch during early June, producing winged and wingless adults. The wingless females produce another generation of wingless adults, which in turn produce a third generation in September. This generation overwinters as immature nymphs. The insect is usually kept under control by natural enemies, but if infestations persist, spraying may be necessary. The insecticide suggested is miscible oil applied before buds swell (late April or early May). If control is not obtained with this dormant spray, an application of Malathion or Diazinon in early June should prove effective.

Before using any of the pesticides mentioned here, read the directions and safety precautions printed on product label. When properly handled these materials present little hazard to the user or the environment. Keep all pesticides away from children, pets, and irresponsible people.

Cottony secretion of the Pine Bark Aphid

