forestry report

Spring 1978 Northern Forest Research Centre Edmonton, Alberta

The bug ranger's lament

For 35 years highly trained Forest Insect and Disease Survey (FIDS) Rangers have prowled the woods and flown the skies of Manitoba, Saskatchewan, Alberta, and the Northwest Territories mapping and sampling forest pest outbreaks. In the early years seldom were their findings directly used by local forest management agencies. While foresters were more than happy to have a federal agency provide the service, they were often unable to respond to the pest information provided. A polite "is that so?" was about all FIDS rangers could expect for their endeavors. Although comfort was taken from the fact that regional pest surveys were part of a national program to compile forest insect and disease information, locally, work was often irrelevant to the immediate needs of struggling forest management agencies barely beyond the stage of timber disposal and rudimentary fire control.

It was inevitable, then, that a shift in direction of the regional FIDS program should occur. In the late 60's the FIDS began concentrating on amenity forestry — parks, recreation areas, campsites, farm shelterbelts, and urban horticulture. Here was an insatiable demand for information and a chance for immediate application of control techniques — indeed a very rewarding and stimulating work environment. Many successful cooperative projects with private industry and provincial, urban, and rural government agencies were undertaken, and the good work continues.

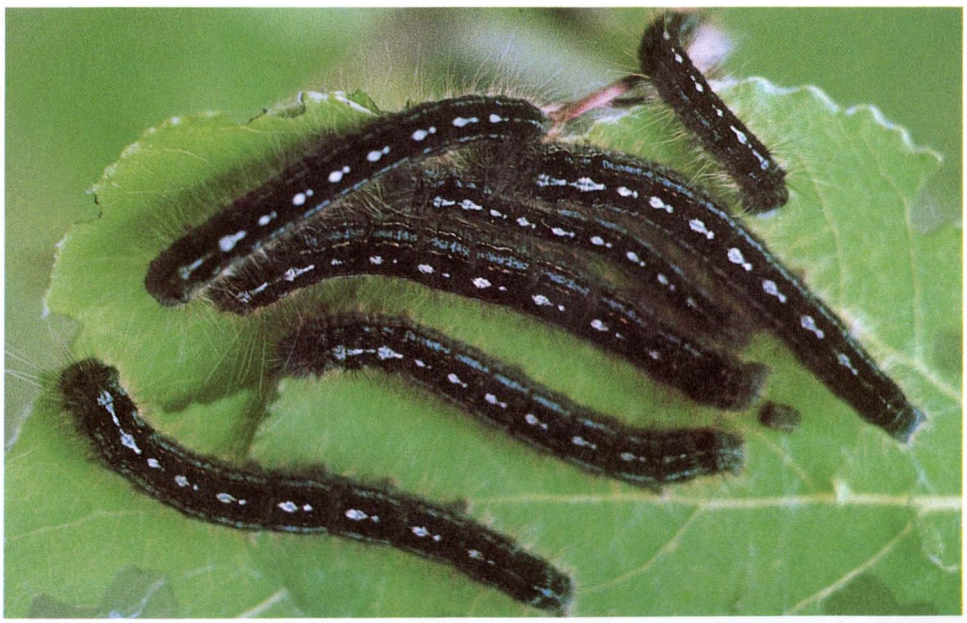
In recent years, commercial forestry developments in the three Prairie Provinces have been rapid and remarkable. Most of the commercial softwood timber has now been allocated. As wood harvesting increased, reforestation programs expanded rapidly. As a result, forest insect and disease losses have assumed much greater importance, and it has become obvious that the FIDS must renew its surveillance of commercial forests. Particular attention will be paid to monitoring the large acreages of man-made or man-assisted forests (plantations, artificial seeding, scarification, controlled burning, etc.) that will be subject to insect and disease problems associated with young trees. Fortunately, this region has not been plagued by forest pests of mature trees to the extent that other regions have, and therefore a large force of rangers has not been required. Although more manpower and operating funds are desirable to carry out these new comprehensive survey activities, it is anticipated that the present staff will be able to handle all basic detection, appraisal, and extension needs, both in commercial and amenity forestry.

In this issue

Forest Insect and Disease Survey

It is still a responsibility of the regional FIDS to provide information to Ottawa for use in planning federal forestry policies and cooperative ventures with provincial governments. New emphases in these areas include the provision of forest pest depletion estimates to the National Forestry Statistics program and contributions to an international spruce budworm program.

Harry Johnson



Forest tent caterpillar larvae feeding on aspen.

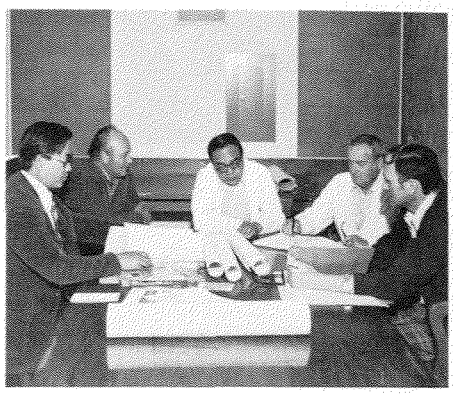
Need help with a forest insect or disease problem?

With 35 years experience in the business of identifying forest pests, appraising their impact on wood production and amenity values, and providing management and control recommendations, why not try us? Satisfied customers include foresters, recreation land managers, district agriculturists, urban horticulturists, technical schools, and the general public.

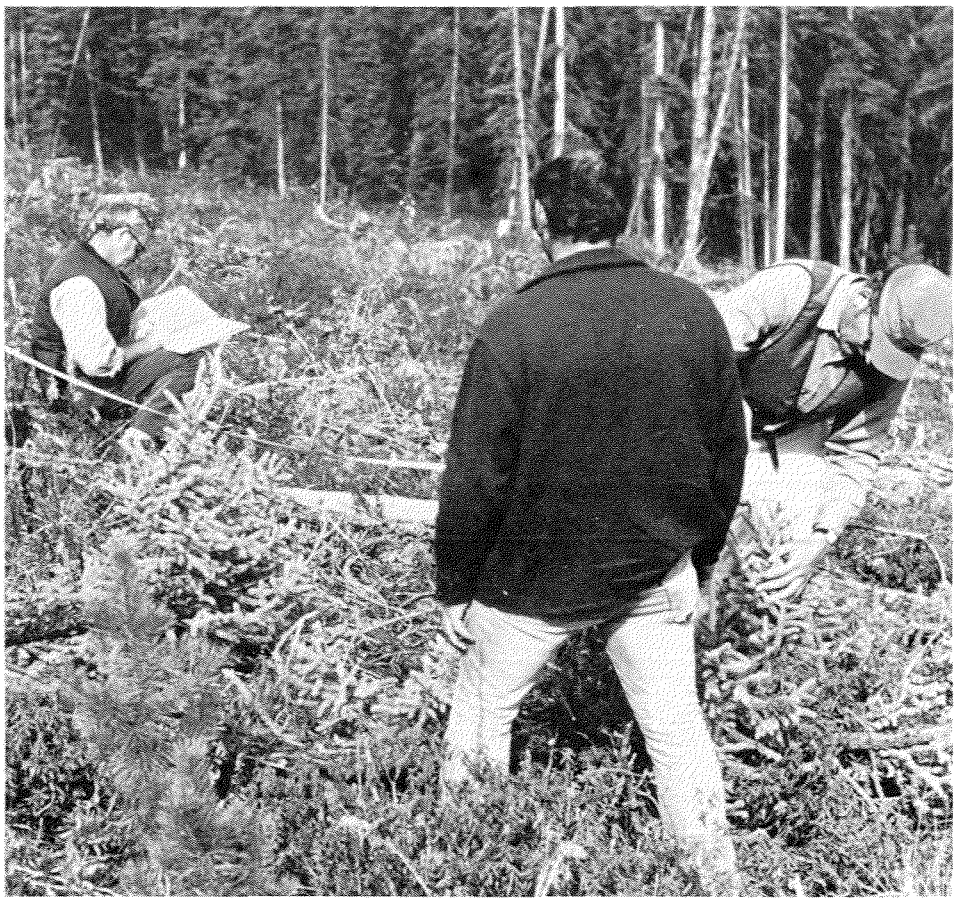
The Forest Insect and Disease Survey unit of the Northern Forest Research Centre (NFRC) consists of 13 professional and technical staff members. Jack Petty heads a knowledgeable team that carries out surveys to appraise the extent and severity of insect and disease attacks for regional forest land managers and federal forestry planning groups. Veteran FIDS Rangers are Vern Patterson, Emile Campbell, and Gary Still; Herb Cerezke is the resident entomologist. Work currently underway includes population monitoring and impact studies of the spruce budworm, forest tent caterpillar, and jack pine budworm. Potential problems such as Scleroderris canker in large-scale monoculture plantations and natural regeneration, and Dutch elm disease in urban and rural settings are also closely watched. Following the completion of surveys, practical management guidelines will be prepared for client agencies, and research recommendations made to NFRC management.

Extension services are provided by a group headed by Jim Emond with FIDS Rangers Bob Caltrell and Craig Tidsbury covering Alberta and Saskatchewan, and Vern Hildahl and Emile Campbell in Manitoba. In 1977 the extension group answered 1250 inquiries in Alberta, 400 in Saskatchewan, and 350 in Manitoba. Service provided included pest identification, appraisal of their potential impact, and appropriate control techniques.In addition, the extension group organizes workshops, contributes to extension courses held by client agencies, prepares Pest Leaflets, and conducts field tours for professional foresters, park personnel, horticulturists, and students.

Backup services for insect and disease identification are also integral parts of the unit. Dick Wong and John Melvin, who between them have over 60 years of experience, can scan their reference collection of over 60 000 immature and adult specimens to quickly identify insects attacking trees or shrubs throughout the Prairie Provinces and the Northwest Territories. Yasu Hiratsuka and Paul Maruyama have the same capability when it comes to disease identification.

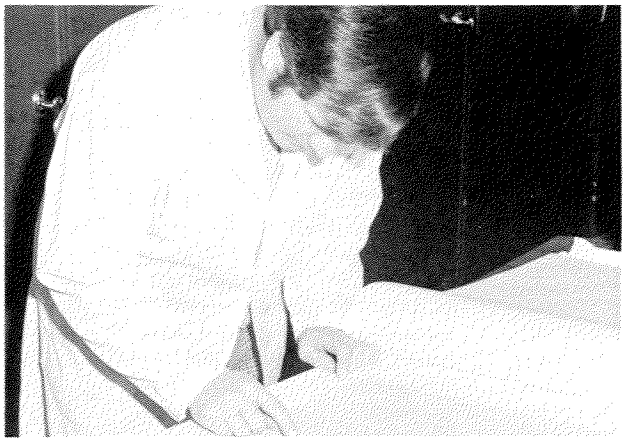


FIDS planning committee: (left to right) Yasu Hiratsuka, Jack Petty, Dick Wong, Jim Emond, and Herb Cerezke.

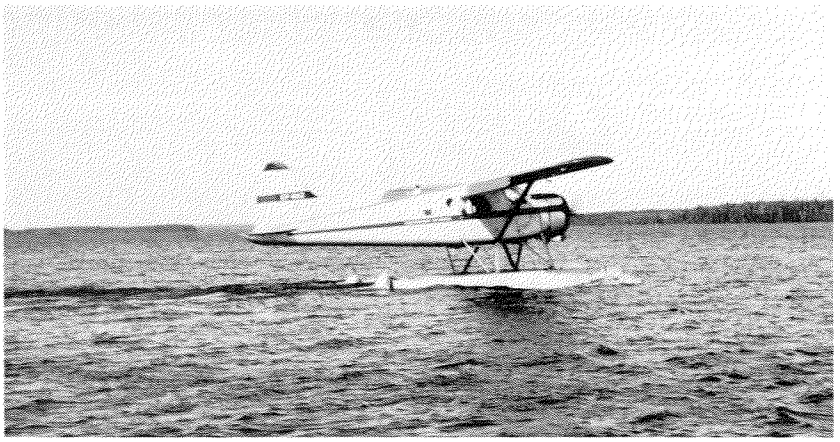


A pest survey in natural regeneration is carried out by survey field staff.

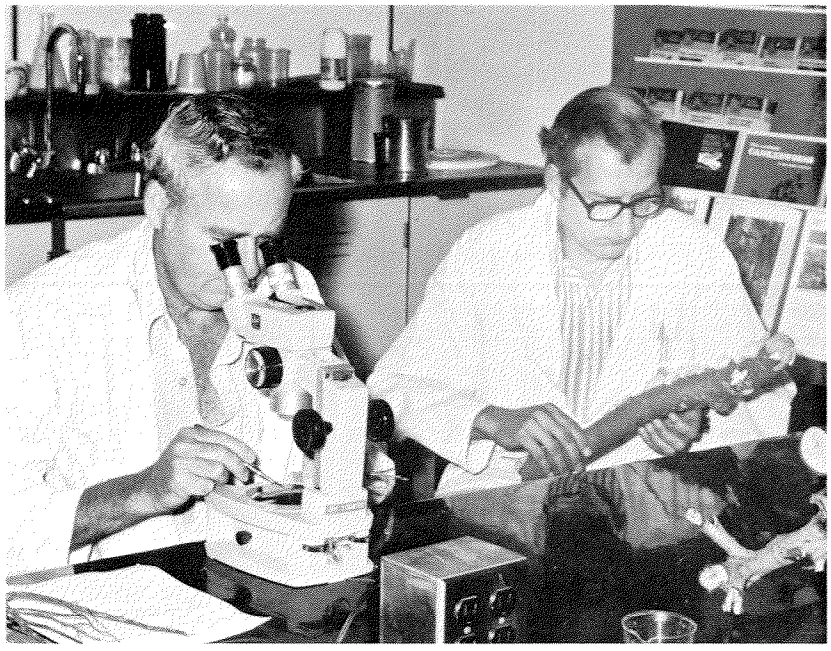
Pole pruners are used to sample out-of-reach foliage damaged by insects or diseases.



Gary Still examines topographic maps on which to locate and plot a recent pest outbreak.



One of the Beavers preferred for survey activities in lake-studded northern Saskatchewan and Manitoba.



Jim Emond and Craig Tidsbury of the tree pest extension service examine sample sent in by FIDS clients.

Publications on pest identification, potential impact, and appropriate control techniques are prepared and distributed.

Paul Maruyama enters a new sample in the FIDS disease reference collection.

Within minutes, veteran insect taxonomy technician John Melvin can put his finger on any one of the 60 000 insects in the FIDS reference collection.

Spruce budworm - how important is it here in the West?

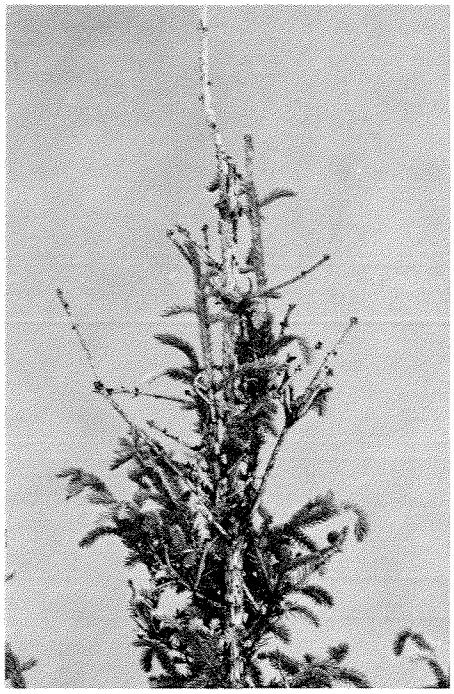
Reference to "spruce budworm" in Canada usually includes the eastern and western budworm species, which together are Canada's No. 1 forest insect enemy. Only the eastern spruce budworm (*Choristoneura fumiferana* (Clem.)) is important in the Prairie Provinces and Northwest Territories. Within its western range it prefers white spruce and balsam fir, but sometimes attacks black spruce. Historical records for the past 40 years indicate that most of the important infestations have occurred in mature and overmature spruce and spruce-fir forests. Many of the larger outbreaks, have persisted along main river valleys such as the Churchill, Mackenzie, Slave, Athabasca, Liard, and Peace rivers.

The spruce budworm has never attained the same prominence as a forest pest in the West as it has in eastern Canada, for several reasons. First, many previous outbreaks occurred in northern areas isolated from timber markets. Secondly, with few exceptions, outbreaks in western Canada have not been as frequent, extensive, or severe as in eastern Canada and the United States. Even during outbreaks, populations have fluctuated considerably from year to year. These fluctuations are probably weather-related, although the scattered locations of many of the spruce and spruce-fir stands likely contribute to keeping populations in check. Thirdly, outbreaks in Manitoba, Saskatchewan, and Alberta have occurred in forests where balsam fir content has varied from only 5 to 15%, and in stands such as in the Spruce Woods, Cypress Hills, and extensive northern areas of Alberta and the Northwest Territories where balsam fir is completely absent. By volume and stand component, therefore, white spruce is by far the most important commercial host in the western range of the eastern spruce budworm. In contrast, the most extensive and destructive budworm outbreaks have typically occurred in the balsam fir-spruce forests of Ontario, Quebec, and New Brunswick where the balsam fir component is much higher. Balsam fir is a more vulnerable species, and in eastern forests the percentage of balsam fir mortality from budworm feeding has generally increased as the basal area of balsam fir increased.

Some of the higher resistance of white spruce to budworm feeding has been attributed to its phenology and growth habits. White spruce buds burst a few days later than balsam fir, and this can influence the feeding behavior and survival of young larvae. New shoots of white spruce grow significantly longer, providing more food for each larva. Shoot growth is also more rapid, lessening the damage to foliage, especially during the early years of infestation. After several years of defoliation, white spruce crowns often produce prolific epicormic shoots, which may hasten the tree's recovery.

Nearly all of the Canadian research on the spruce budworm has been carried out in the eastern provinces where tree losses have been high since at least the 1920's. Aerial spraying against the budworm first began in Ontario in 1944, and has been used almost annually since 1952 in New Brunswick. Over the past several years Ontario, Quebec, and New Brunswick have undertaken large-scale spray programs to restrict damage in budworm-infested forests. In the Prairie Provinces only Manitoba has initiated (since 1973) aerial spray programs to protect the aesthetic value of spruce in the Spruce Woods Provincial Park. Elsewhere, in the commercial forests of the Footner Lake and Athabasca Forests of northern Alberta and at Namew Lake, Manitoba, timber losses from budworm damage were minimized by mapping and identifying high hazard stands and then salvage logging them. This management technique appears to have been adequate for this region, but has required monitoring of infestations to establish the early stages of stand deterioration.

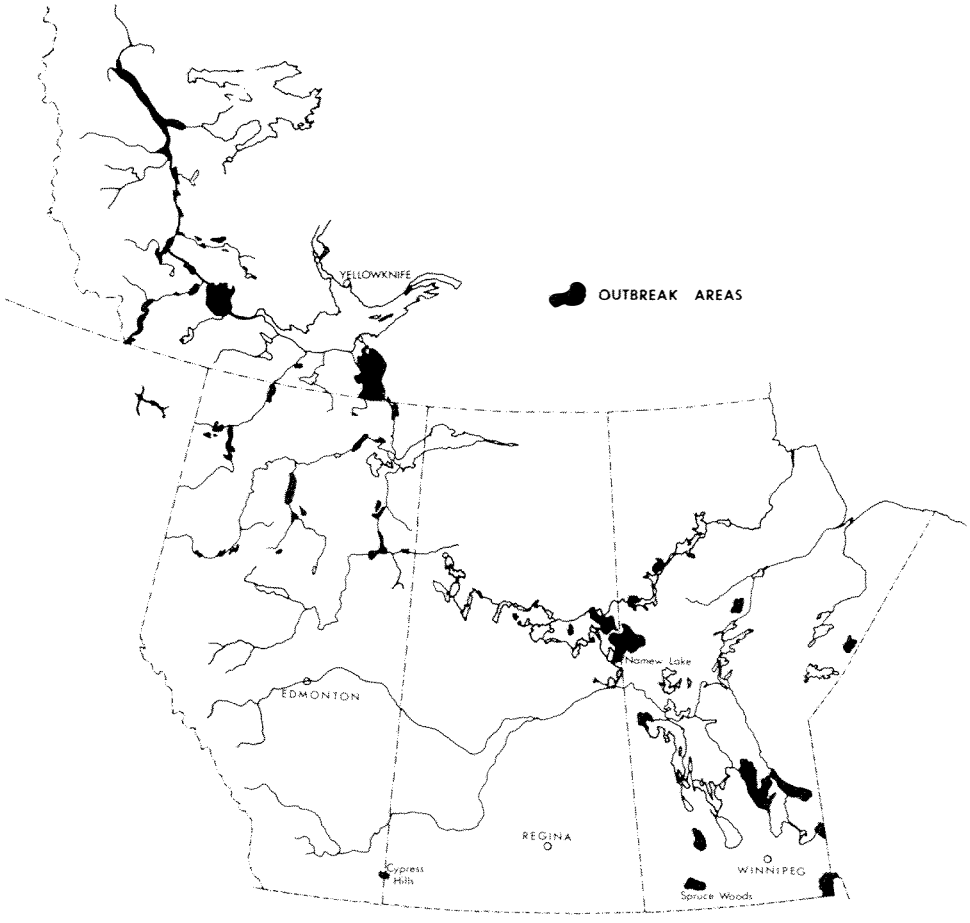
As a result of the large and continued insecticide spray programs in eastern Canada, there are growing concerns about environmental protection, cost benefits of spray programs, and the short- and long-term effects of insecticides. Consequently, there is mounting pressure to decrease the use of chemical insecticides and to seek other more environmentally acceptable forms of control.



Spruce budworm damage on white spruce.

An eastern spruce budworm larva feeding on white spruce needles.

What are the impacts of the eastern spruce budworm in western Canada? Unfortunately, losses due to budworm feeding are poorly documented in western spruce and spruce-fir stands. However, one of the longest outbreaks (1951-1968) at Namew Lake resulted, after 8-10 years of severe defoliation, in an estimated 30% and 40% mortality respectively for white spruce and balsam fir over some 650 km² of forest. An "eastern Manitoba outbreak" (1954-1960) caused 20% mortality of merchantable white spruce and over 65% mortality of balsam fir on some 260 km² of forest. In northern Alberta a survey in 1962 over 31 km² revealed 6% mortality and 23% top kill after an unknown number of years of defoliation. However, mortality of dominant and codominant mature spruce near the epicenter of this outbreak ranged up to 40%, top kill up to 50%, and volume losses between 10 and 50%. Farther north along the Mackenzie River, N.W.T., mortality of mature white spruce ranged from 30 to 55%, while top kill ranged from 25 to 70%. In three different spruce forests in northern Alberta the incidence of top kill decreased with tree height in individual stands, indicating that merchantable-size trees suffer less severely than trees in the lower crown classes. In general, mortality of white spruce begins after the fifth year of severe defoliation, while top kill begins earlier but can be variable depending on the character of the forest and larval population size.



Main outbreaks of the eastern spruce budworm in western Canada between 1938 and 1977.

Losses in radial increment of white spruce usually appear in the lower stem 2-4 years after the start of an infestation, but may continue for 1-3 years after cessation of the outbreak. Reductions of 50% or more of the normal increment may be common. Radial losses are important because they often occur on all stems within the infested area and extend beyond the collapse of the budworm outbreak.

Concurrent with defoliation is the probable inhibition of cone production, which may have significance in seed and cone collecting areas and where seed from undisturbed stands is required to regenerate adjacent clearcuts. The budworm larvae also feed on buds and cones, destroying some and causing others to contain fewer sound seeds.

In park and recreational areas, shelterbelts, and ornamental spruce plantings where aesthetic values are foremost, a much lower level of spruce budworm damage is usually tolerated. Consequently, we need to develop assessment methods that measure aesthetic impairment in terms of foliage loss, foliage discoloration, and tree form.

The current budworm outbreaks in eastern and western Canada and the United States are among the most severe on record. They have precipitated national and international reviews of budworm research and forest management programs and culminated in the signing in 1977 of a joint Canada/U.S.A. agreement (CANUSA Spruce Budworm Program) to develop control strategies. Although NFRC may have little direct involvement in this 6-year cooperative effort, there will undoubtedly be many benefits in the form of new information useful for management of budworm-susceptible forests.

Within the Prairie Provinces, the several small infestations noted in 1977 will be monitored. We should also consider the future of the extensive aspen forests with an understory of spruce in northern areas; in time these forests may become more susceptible to the budworm as the normal climax stage of coniferous growth is attained. The present level of fire protection will help to ensure maturation of extensive spruce-aspen stands, which do not now exist. Thus, in future years the composition of maturing stands may allow budworm outbreaks to be more extensive than they have in the past 40 years.

Herb Cerezke

Jack pine budworm

The jack pine budworm (*Choristoneura pinus pinus* (Free.)), a close relative of the spruce budworm, is the most important insect enemy of jack pine in Manitoba and Saskatchewan. While its main host is jack pine, it also attacks red, Scots, lodgepole, and eastern white pines and occasionally spruce. Records since 1936 indicate that outbreaks occur over short intervals, most lasting 2-5 years and some encompassing many hundreds of square kilometres of jack pine stands. Main target areas have been pine forests and plantations east and southeast of Lake Winnipeg, the Interlake Region, and the Spruce Woods Provincial Forest of Manitoba. In Saskatchewan, the Nisbet, Fort à la Corne, Canwood, and Pines Provincial Forests have been attacked. So far this budworm has not been observed in Alberta.

In 1954, infestations were observed for the first time in plantations of jack, lodgepole, and Scots pine that had been planted in the Spruce Woods Provincial Forest between 1904 and 1929. After 2 years of severe defoliation, Scots pine of the 30-year age class had suffered the most damage, with 22% mortality and 38-54% of trees with the upper third of the crown dead or dying. A more widespread outbreak that erupted in the Spruce Woods in the mid-1960's prompted the first aerial insecticide spray trials in 1967 to protect high-value plantations. Recent resurgence of infestations in the plantations has resulted in a continuation of the aerial spray program since 1974.

In 1977, jack pine budworm caused moderate to severe defoliation on over 20 000 ha of jack pine forest near Prince Albert, and a similar area of moderate to severe defoliation in plantation and native stands in the Belair, Sandilands, and Spruce Woods Provincial Forests of Manitoba. NFRC personnel are cooperating with provincial authorities to monitor these areas in 1978.

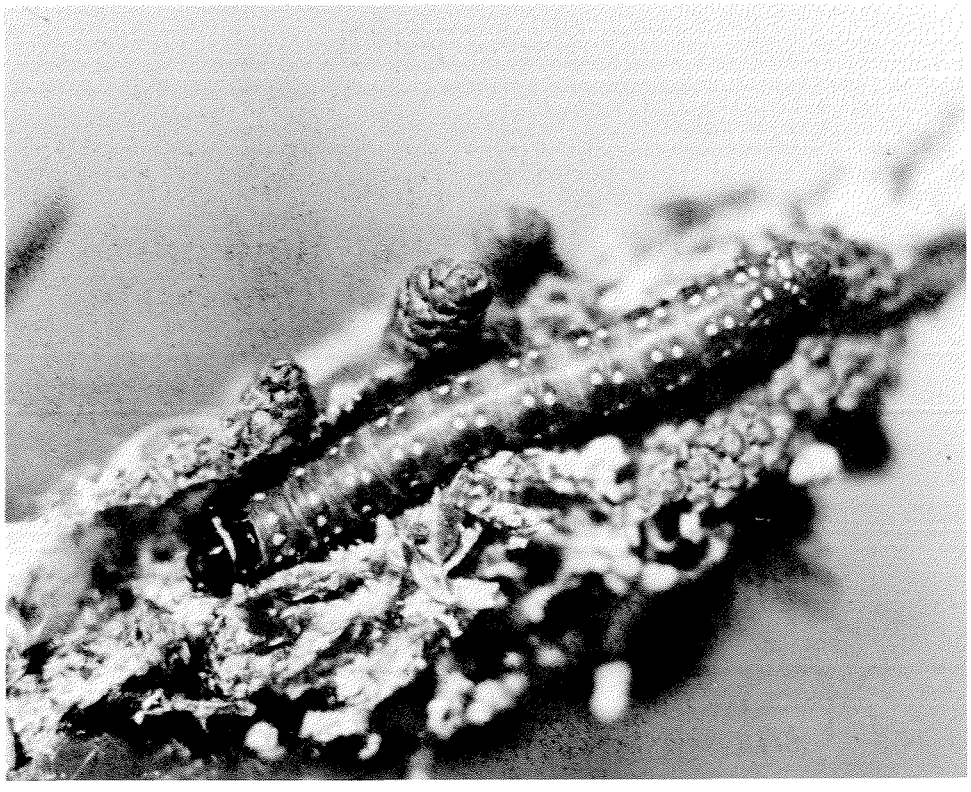
Defoliation by the jack pine budworm typically spreads from the top of the crown downward. Consequently, top killing and reduced annual growth are the most common losses. Tree mortality in jack pine stands has been light thus far, but can occur after 2 or more consecutive years of severe defoliation.

Considerable data have been gathered in Manitoba on tree losses during different infestations. In 1944, jack pine stands in the Sandilands Provincial Forest suffered a 12-60% top kill; in a 1947 attack an average 6% top-kill was recorded. Near Gypsumville a cruise in jack pine indicated an average 10% mortality, most of which was confined to the smallest trees less than 8 cm dbh. In these stands tree mortality was inversely related to tree diameter. A similar cruise in the Sandilands in 1956 found an average 6% loss in basal area due to tree mortality, which again occurred mostly on trees of less than average diameter. Thus, the natural stands have not been damaged as severely as some plantations. In general, tree growth losses and mortality have been most common in stands that are open-grown, overstocked, overmature, or growing on poor sites.

Radial growth losses have been inadequately studied in budworm outbreak areas in Canada. However, data from elsewhere indicate that little reduction in radial growth on jack pine occurs in the first year of defoliation, but in the second year growth is reduced proportionately to the severity of defoliation, ranging from 40 to 95% for light to very severely defoliated crowns. Losses may continue for 1-3 years after the collapse of outbreaks. Scots pine severely defoliated for 2 consecutive years showed radial increment losses of 50% the first year and 80% the second year.

When abundant, the budworm larvae may feed on the developing cones, thus reducing the seed supply. Staminate (male) flowers are the preferred food of the young larvae. However, severe defoliation for 1 or more years inhibits the subsequent production of these flowers; this, together with foliage loss and terminal shoot and bud damage plays an important role in bringing about the usually abrupt collapse of budworm populations. Trees defoliated in parks and other areas of high use are rather unattractive and distress the general public. However, it is worth noting that the jack pine budworm is a natural component of jack pine forests, and that its damage is temporary and not usually as severe as the red coloration of the defoliated crowns might first indicate.

Herb Cerezke



Jack pine budworm larva.

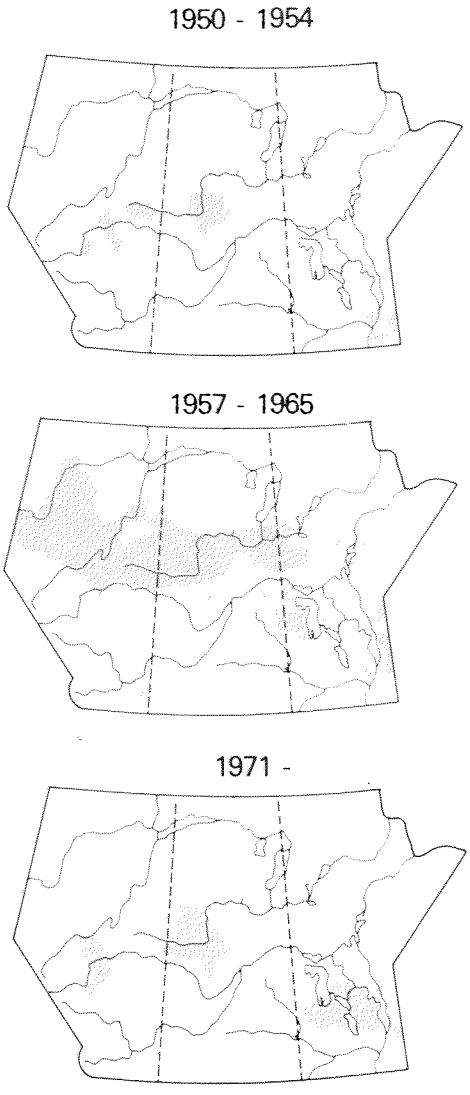
Forest tent caterpiller

When hordes of migrating forest tent caterpillars (*Malacosoma disstria* Hbn.) invade populated areas, residents become very concerned, and well they should. Vast expanses of deciduous forests have been completely stripped of foliage. Picnickers, tourists, and sportsmen have been ousted from recreation areas that were overrun by the pests. Tourism may have suffered in some areas as a result. There have been three major forest tent caterpillar outbreaks in the Prairie Provinces since 1950: 1950-54, 1957-1965, and 1971 to the present.

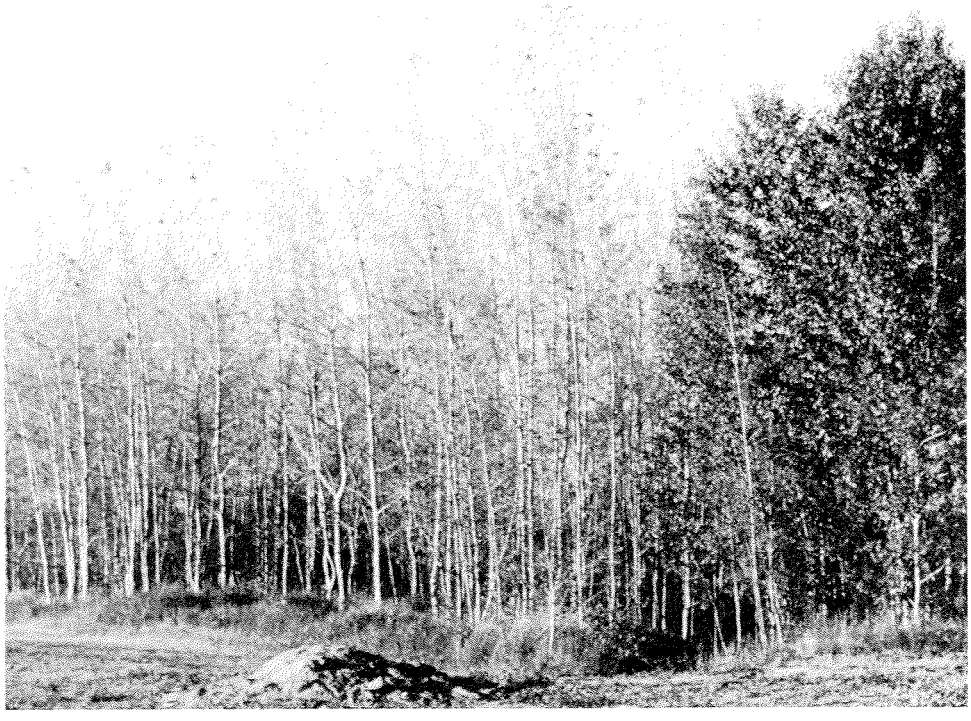
The Canadian Forestry Service, in cooperation with the Entomology Section of the Manitoba Department of Agriculture and the Parks Branch of the Manitoba Department of Tourism, Recreation and Cultural Affairs, has for several years carried out egg-band surveys in order to predict infestation levels and distribution of the pest in Manitoba. The results of the 1977 survey indicate that there will be a general decline in caterpillar populations in the province in 1978. Limited surveys and general observations in Saskatchewan and Alberta seem to indicate that moderate to severe infestations will recur in scattered areas in these two provinces in 1978.

Aerial application of insecticides has been effectively used for seasonal control of the pest in selected areas. However, no economical methods have been found to effectively control large-scale infestations, and there is a growing concern about the environmental effects of large-scale use of chemical insecticides. Research into biological methods of pest control is presently underway at NFRC by Bill Ives and Jim Muldrew. *Sarcophaga aldrichi*, a parasitic fly, and *Nuclear polyhedrosis*, a virus, are presently being tested aerially and on the ground against the forest tent caterpillar. Preliminary results of the virus spray to control this insect are promising; they are outlined in Information Report NOR-X-204, available from NFRC. A technical report entitled "Forest tent caterpillar in the Prairie Provinces" for forest managers and a Pest Leaflet for public use are also available.

Gary Still



Distribution of forest tent caterpillar outbreaks between 1950 and 1975.



A trembling aspen stand defoliated by the forest tent caterpillar.

On cool days and in the evening forest tent caterpillar larvae cluster on the main stem of infested trees.

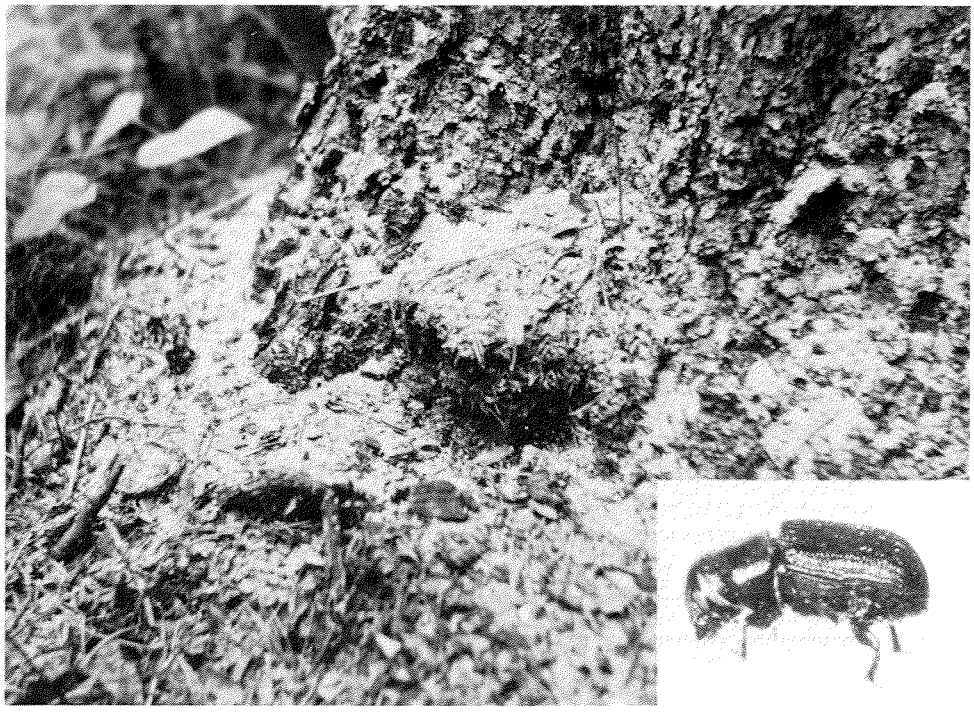
Mountain pine beetle

The mountain pine beetle, known in scientific circles as *Dendroctonus ponderosae* Hopkins, has caused a series of extensive infestations of lodgepole pine in western Canada. It is estimated that this bark beetle has killed 36 400 m^3 (1.3 million ft^3) of timber each year for the last 20 years in British Columbia. It has also caused serious damage in Alberta. An outbreak of the mountain pine beetle that occurred in Banff National Park in the Bow River valley and tributaries near Banff in 1940 damaged 4070 ha (10 060 acres) of practically pure stands of lodgepole pine. Prompt cutting and burning of infested trees in 1941-1943 and 12 days of subzero weather in the middle of January 1943 greatly reduced populations of the bark beetle for a number of years. Recent surveys, however, have indicated that the mountain pine beetle is again on the increase. In 1977 damage by this beetle was evident in the Crowsnest Forest and in Waterton Lakes National Park.

The adult of the mountain pine beetle can easily be recognized by its stout, black, cylindrical body measuring between 4 and 8 mm in length. It attacks lodgepole pines with stem diameters greater than 20 cm and older than 80 years. Infested trees can be recognized not only by the reddish brown foliage, pitch tubes on the bole, and boring dust at the base of the tree, but also by the vertical egg galleries with a slight hook at the bottom, which are constructed by the females in the inner bark.

Climatic factors usually keep the mountain pine beetle in check in southwestern Alberta. The past two mild winters and the maturing of lodgepole stands in this area probably contributed to the present infestations. The cutting and burning of infested trees have already been started in the Syncline Campground, Crowsnest Forest in late 1977 to combat this insect.

Dick Wong



Sawdust at the base of this lodgepole pine indicates the presence of the mountain pine beetle. Inset is an adult beetle.

Fire blight

Fire blight is a serious and destructive disease of plants in the rose family (Rosaceae), which includes many fruit tree species. It is caused by the bacterium *Erwinia amylovora*.

Fire blight is becoming increasingly prevalent throughout the Prairie Region, especially in urban areas, where it commonly affects apples, crab apples, mountain ash, pear, and plum. It occasionally attacks other related species such as raspberry, cotoneaster, hawthorn, and saskatoon. In most populated areas these susceptible species represent a high percentage (35% in Edmonton) of the trees and shrubs planted.

Because this very infectious disease is easily spread by insects such as leafhoppers, flies, bees, aphids, and ants, one diseased tree can infect a whole neighborhood. Consequently, the presence of this disease in an area necessitates immediate implementation of preventive and control measures.

Fire blight is characterized by a sudden wilting and then shriveling and blackening of blossoms, leaves, new shoots, and young fruit. Droplets of amber-colored liquid may exude from newly infected areas. The affected parts appear as though they had been scorched by fire — hence the name.

There is no chemical that can cure fire blight. Some degree of control can be achieved by pruning out diseased twigs and branches during the summer. Blossoms, the most susceptible part of the plant, can be protected by spraying with streptomycin sulfate or fixed copper formulations.

In 1977, approximately 10% of all enquiries received at NFRC were about fire blight. If moist, warm conditions (optimum for disease development) prevail during the growing season, the disease could be even more of a problem in our area. A Pest Leaflet describing preventive and control measures for fire blight has recently been published.

Jim Emond

Birch leaf-mining sawflies

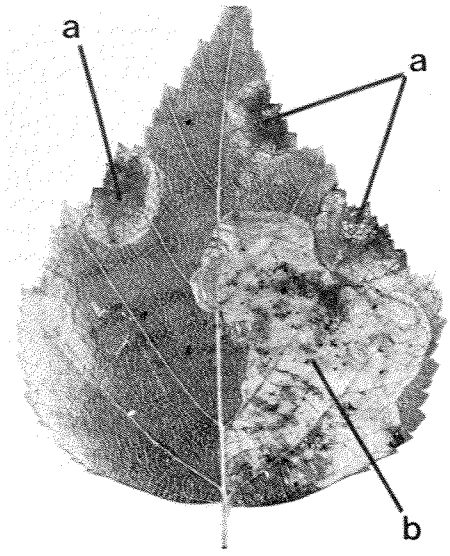
Birch are grown widely throughout the Prairie Provinces as shade trees and for landscape beautification. Several species are popular, including the native paper birch, *Betula papyrifera*, and the European weeping varieties of *B. pendula*. In Edmonton alone, birches rank as the third most commonly planted tree (over 110 000) on residential lots. In recent years blotched and skeletonized foliage caused by birch leaf-mining insects has become a common sight in mid- and late summer.

All planted birches are susceptible to attack by these sawflies. The most common species, known as the birch leaf miner, *Fenusa pusilla* (Lep.), has been reported in Alberta since at least 1939. More recently, and probably since the early 1960's, two additional leaf-mining species have become increasingly numerous. These are the ambermarked birch leaf miner, *Profenusa thomsoni* (Konow) and the late birch leaf edge miner, *Heterarthrus nemoratus* (Fall.). All three species have apparently been introduced into North America from Europe, probably on infested nursery stock. Studies in eastern Canada suggest that there are few if any host-specific parasites that attack the leaf-mining species, a circumstance that has no doubt contributed to the successful spread and high populations of leaf miners.

The three species have somewhat different life histories and attack behavior, which allow them to coexist on the same host in relatively high numbers and mine 75% or more of the leaves. For example, *F. pusilla* usually produces two generations per year and prefers to attack young, partly developed leaves on the exposed portions of the tree crown. In contrast, the other two species attack mature leaves more within the crown, with *P. thomsoni* initiating most of its egg-laying attacks along leaf veins away from the leaf margin. Attacks by *H. nemoratus* are always at the leaf margin and show up as rust-colored blotches. Thus, there is an ecological separation of the species within the crown, on old and newly formed leaves, and on different parts of the leaf surface. Both the latter two species produce one generation per year and are late-season feeders. In 1977, *P. thomsoni* tended to be the most common species on ornamental birch growing in semishaded locations, while in some natural stands of birch it was the only species observed.

There is no practical method of controlling the leaf miners other than by insecticides. The presence of the three species on the same tree complicates the timing and number of insecticide treatments needed to control the larval stages, which may be present from early June right through to late fall. The loss of leaf photosynthesizing surface due to mining does not cause tree mortality. However, the aesthetic appearance of the tree suffers and the cumulative effects of mined leaves can reduce tree vigor. A Pest Leaflet describing control measures for the birch leaf miner is available from NFRC.

Herb Cerezke



A white birch leaf mined by (a) the late birch leaf edge miner and (b) the ambermarked birch leaf miner.

Fire blight damage on crab apple.

Dutch elm disease continues to spread in Manitoba

Dutch elm disease (DED), caused by the fungus *Ceratocystis ulmi* (Buism.) C. Moreau, is the most important and serious tree problem in Manitoba. It is currently ravaging both the native and planted American elm stands. The disease was first diagnosed at Brandon, Selkirk, and Winnipeg in 1975. In all cases the infections occurred in picnic grounds and campsites adjacent to the Assiniboine and Red rivers. Because these outbreaks were a hazard to adjacent healthy American elm stands, the Manitoba Department of Agriculture immediately implemented a provincial-municipal cost-sharing sanitation program to reduce the ravages of the disease. However, despite the removal and disposal of confirmed diseased trees and many dying and recently dead elms, Dutch elm disease has continued to spread and intensify. It is now firmly established in 10 municipalities in southern Manitoba as well as in the cities of Brandon and Winnipeg and the town of Selkirk.

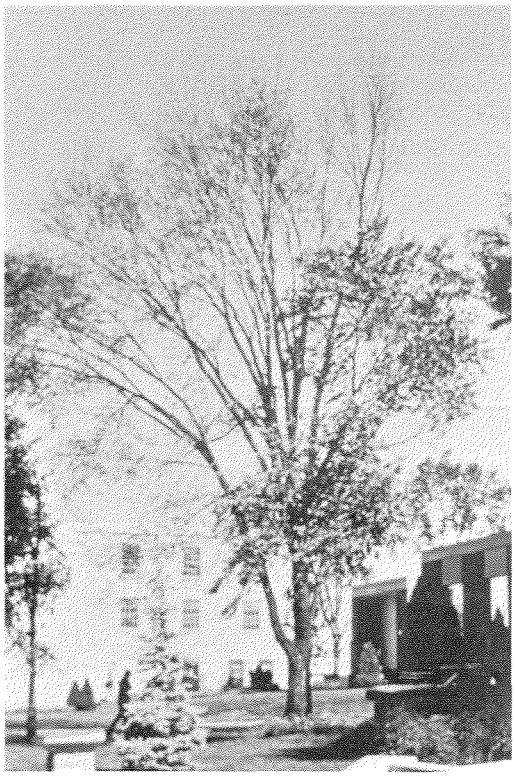
In 1976, increased incidence of diseased trees was particularly notable in the Brandon and Selkirk areas, where the problem was exacerbated by high populations of the native elm bark beetle, *Hylurgopinus rufipes* (Eichh.), chiefly responsible for spreading Dutch elm disease in Manitoba. In addition, new localized outbreaks ranging from light to severe were recorded in Winnipeg Beach, Teulon, Matlock, Scanterbury, Beaconia, Grand Beach, Pine Falls, Lockport, Beausejour, at scattered locations along the Brokenhead River, and in Beaudry and Highland Provincial Parks. In the City of Winnipeg the number of diseased trees increased from 7 in 1975 to 79, in Brandon from 10 to 79, and in Selkirk from 45 to 557.

In 1977, the most significant extension of the range of Dutch elm disease was a localized outbreak in and around the town of Sprague. Native elm stands in this area are fairly isolated, so the disease must have been introduced accidentally by tourists travelling by vehicle through infected areas of Ontario or Minnesota. Although there was a slight decrease in the total number of confirmed diseased trees elsewhere (948), new infections were recorded at Gimli, Lac du Bonnet, and Belair. In addition, the old infections along the Brokenhead River increased in extent as well as in intensity. In the cities of Winnipeg and Brandon the incidence of confirmed diseased trees decreased slightly to 69 and 71, but increased to 570 in Selkirk.

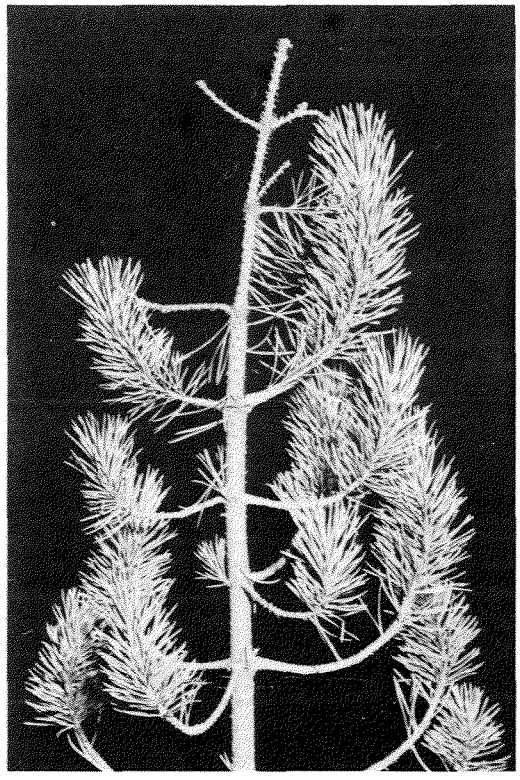
Between September 1975 and March 1977, 32 000 elm (1033 were confirmed as diseased) were removed and destroyed under provincial-municipal cost-sharing sanitation programs. To date, indications are that these sanitation programs have been effective in keeping Dutch elm disease incidence at low levels in urban centers such as Winnipeg and Brandon. However, there appears to be little hope of saving elm stands in rural areas of southern Manitoba. In all probability, these stands will be devastated by the disease during the next 10 years. Landowners are encouraged to salvage their elm stands for lumber and other wood products as soon as possible.

In Saskatchewan and Alberta, creation and enforcement of pertinent pest legislation along with good tree maintenance programs should protect planted elms for many years.

Vern Hildahl



American elm ravaged by Dutch elm disease.



Dieback symptoms of Scleroderris canker on lodgepole pine regeneration.

What's bugging you?

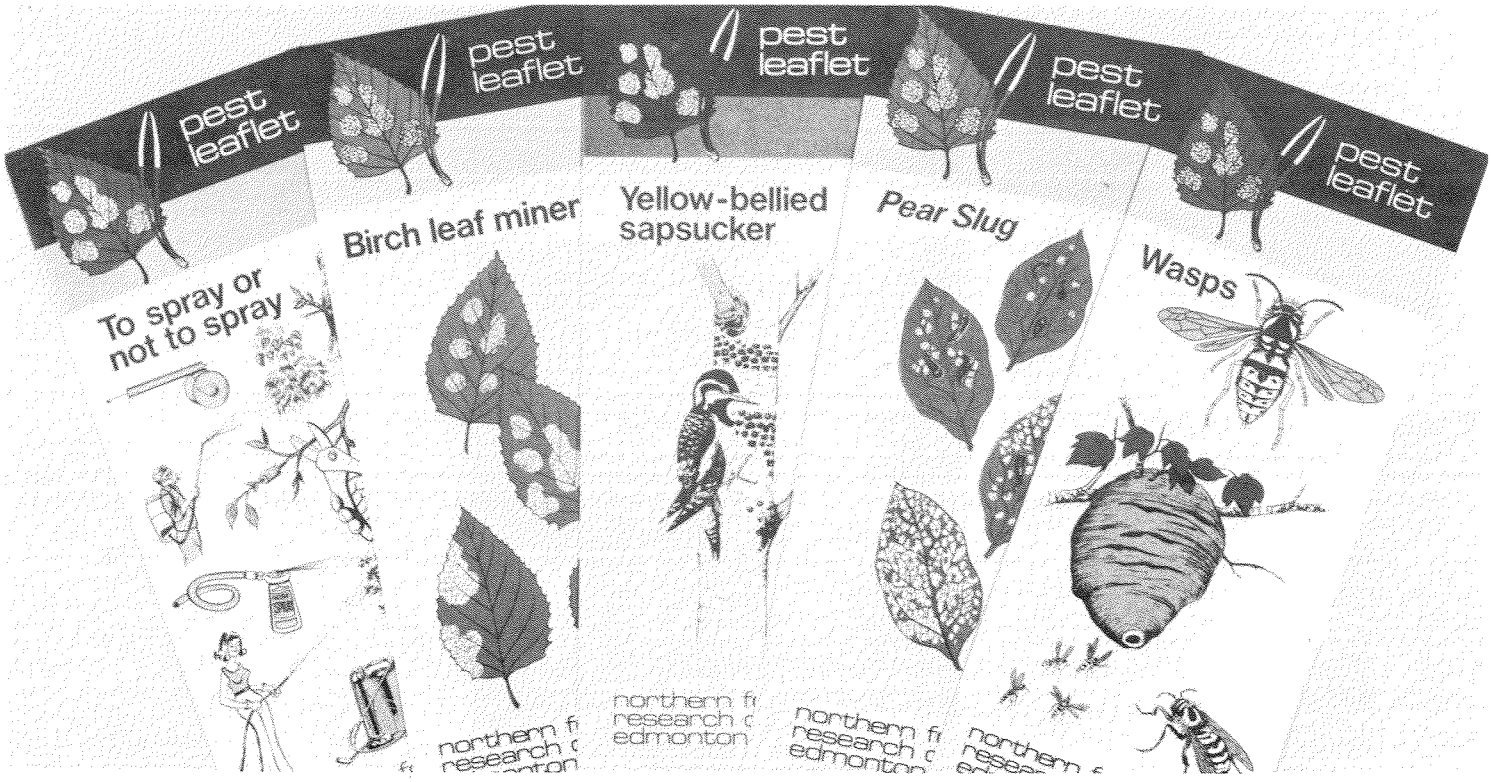
Even if you are not an insect and disease expert, you can, by careful observation, accurately describe the damage to someone who is. Within the NFRC that "someone" is an Insect and Disease Survey Ranger who can diagnose the cause of your problem and also suggest appropriate control measures. A series of Pest Leaflets is also available from the NFRC to help you and the average homeowner confirm the diagnosis supplied by the expert and provide preventive and control treatments, both chemical and non-chemical. A short section entitled "The cause" contains pertinent details on the life history of the insect or disease. To date, 23 Pest Leaflets have been published:

1. Birch leaf miner
2. Pear slug
3. Fall cankerworm
4. What's wrong with my tree?
5. Yellow-headed spruce sawfly
6. To spray or not to spray
7. Yellow-bellied sapsucker
8. Spruce needle miner
9. Lilac leaf miner
10. Aphids galore
11. Uglynest caterpillar
12. Cooley spruce gall aphid
13. Poplar bud gall mite
14. Spruce spider mite
15. Frost damage of poplar
16. Pine needle scale
17. Forest tent caterpillar
18. Sprayers and spraying
19. Wasps
20. Spruce budworm
21. Large aspen tortrix
22. Ticks
23. Fire blight

Soon to be released are Pest Leaflets on the white pine weevil and a willow shoot-boring sawfly.

If you are an urban horticulturist, district agriculturist, or on the staff of federal or provincial departments of agriculture or the extension service of a university that advises the general public on pest problems, then copies of the Pest Leaflets can be made available to you and your staff for distribution. For particulars contact the Head, Insect and Disease Survey at the Northern Forest Research Centre.

Ross Waldron



Scleroderris canker - a future problem in plantations?

In the summer of 1974, Scleroderris canker, caused by the fungus *Gremmeniella abietina*, was found near Maligne Lake in Jasper National Park. This was the first discovery in western North America of a disease that has been considered one of the most destructive nursery and plantation diseases of conifers in Europe, eastern North America, and Japan. Since the 1974 discovery, the disease has also been found in three widely separated locales in British Columbia. It has not been found in nurseries or plantations in western Canada. Scientists consider this fungus to be a part of the indigenous western flora and not a recent introduction from eastern North America, as speculated at first.

Recently a new very virulent form of the disease was found in the states of New York and Vermont, close to the Canadian border, and it is spreading rapidly. This form, believed to be introduced from Europe, is killing mature trees as well as the young trees usually killed by existing North American races of the disease. The FIDS will be monitoring this disease and keeping resource managers in the region advised on its status.

Yasu Hiratsuka

UFO lands in Alberta?

An unusual circular disturbance in the forest about 25 km north of Hinton, Alberta, was reported by the staff of the Alberta Forest Service and referred to the Canadian Forestry Service for investigation. In August 1977, Yasu Hiratsuka and Herb Cerezke, together with Bryden Ward of the Alberta Forest Service, visited the site to determine the cause of the disturbance. The area of dead and dying trees is circular in shape, covering about 0.1 ha within a normally stocked even-aged lodgepole pine stand about 85 years old. All lodgepole pines within the circular area (about 110) appeared dead, and about 30 trees around the periphery were still dying or partially killed. On-site examination and soil analysis have ruled out fire, insects, diseases, chemicals, and climatic conditions as the primary cause of the disturbance. The most plausible explanation at this time is "tree group mortality" caused by lightning, which has frequently been reported in Europe, Australia, and U.S.A., although never in Canada. Reexamination of the site will be necessary to confirm this possibility. The exact mechanism of the tree group mortality is not known, but apparently under certain conditions a lightning strike kills surrounding trees without causing fire.

Another circle of dead trees was spotted by a helicopter in the same general area, and circular tree mortality involving about 62 mature lodgepole pines has been reported from Cypress Hills Provincial Park.

Yasu Hiratsuka

Circular forest disturbance near Hinton, Alberta.

Close-up of dead and dying trees.

Forestry Report Coordinator this issue: Yasu Hiratsuka
Editors: Ross Waldron and Pat Logan

For further details concerning articles in this issue, write Yasu Hiratsuka, Northern Forest Research Centre, 5320-122nd Street, Edmonton, Alberta, T6H 3S5

Environment Canada Forestry Service
Environnement Canada Service des Forêts