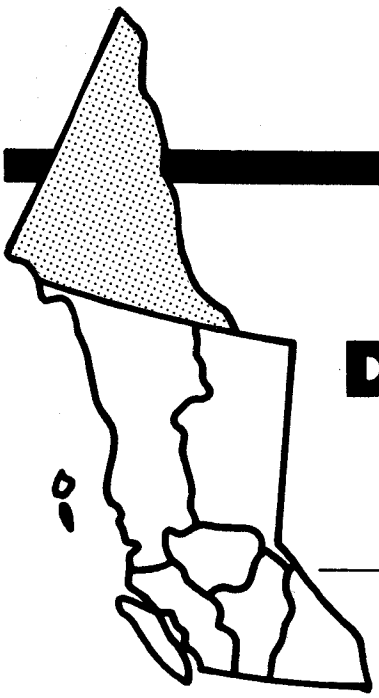

Forest Insect and Disease Conditions

Yukon Territory
1987

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Government of Canada
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Canadian Forestry Service
Service canadien des forêts

CONTENTS

INTRODUCTION

This report summarizes forest insect and disease conditions in the Yukon Territory in 1987. Pests are listed by host with emphasis given to those capable of sudden damaging outbreaks.

During the two week survey in late June and early July, over 75 insect and disease samples were collected at over 40 permanent and 25 random sites (Map 1), in stands from Watson Lake west to the Haines Road and the Alaska border, along the Klondike and Robert Campbell highways, and along the Canol Road north and south of Ross River. Only 15% of beating samples at permanent sampling stations were positive, a reflection of the cool spring which retarded insect development. Special surveys included assessments of: potential spruce beetle populations near Kusawa Lake; larch sawfly populations north and west of Watson Lake; Svenska Cellulose lodgepole pine trials near Takhini; lodgepole pine mortality near Ethel Lake and along the Lower Canol Road; aerial surveys for spruce budworm in the La Biche River Valley; a cooperative spruce budworm pheromone trapping program; surveys for diamond willow disease, and pests of young stands.

Yukon Forest Service personnel were contacted at Whitehorse where a meeting was held with headquarters staff to discuss pest problems. Contact was also made with the Yukon Forest Service at Haines Junction, Ross River and Watson Lake.

The Forest Insect and Disease Survey is a nationwide network within the Canadian Forestry Service (CFS) with the responsibility of producing an overview of forest pest conditions and their implications; maintaining records and surveys to support quarantines and facilitate predictions; supporting forestry research with records, herbaria and insect collections; providing advice on forest insect and disease conditions; and developing and testing survey techniques and conducting related biological studies.

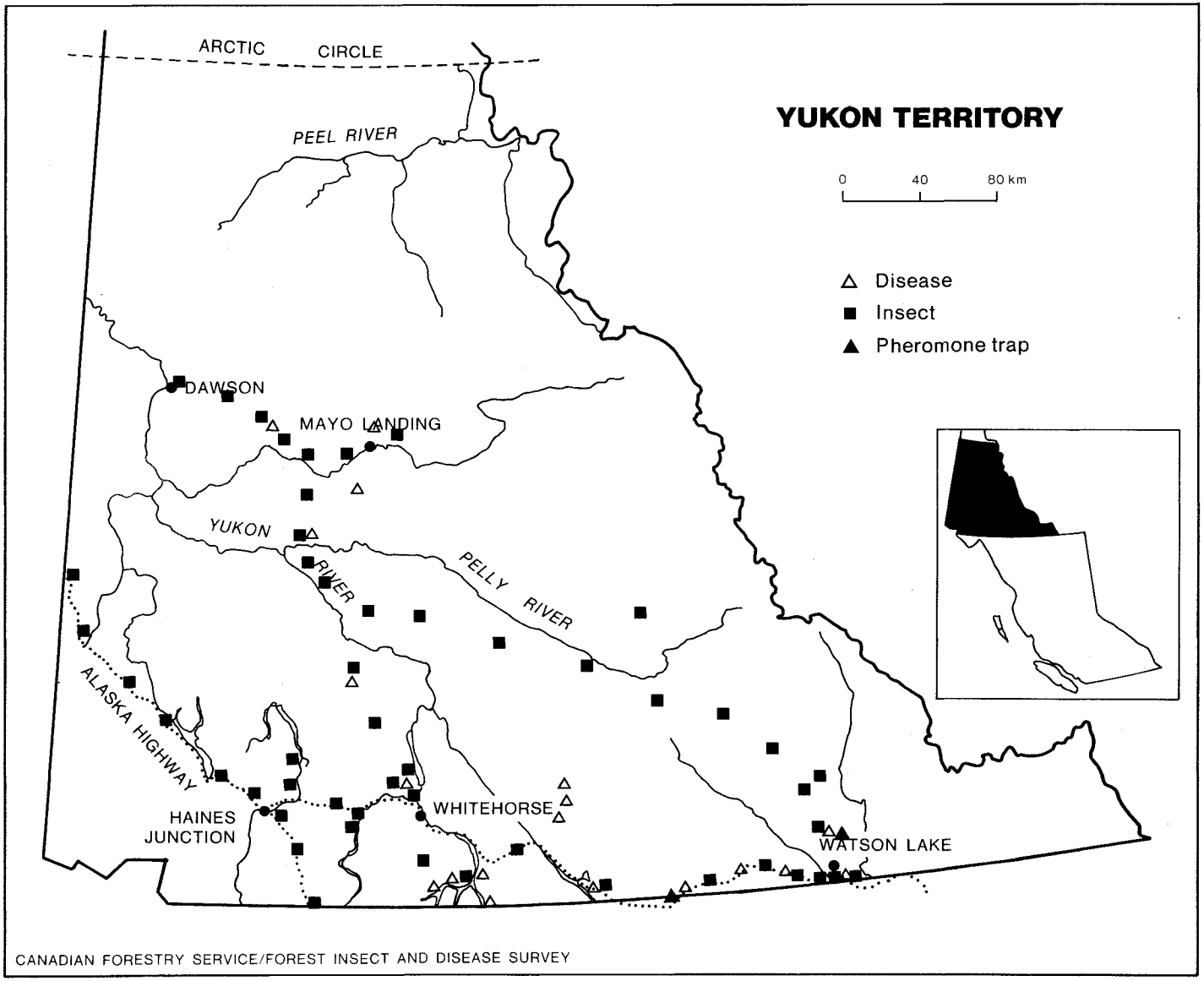
SUMMARY

For the third consecutive year, defoliation of white spruce and some alpine fir by the **eastern spruce budworm** continued at light and moderate levels over approximately 1 000 ha in the La Biche River valley. Endemic levels of **spruce beetle** were found near the north end of Kusawa Lake. **Spruce broom rust** commonly infected white and black spruce throughout the Territory, particularly in the Teslin area, along the Robert Campbell Highway and in the Mayo-Elsa area.

Larch sawfly populations were active in tamarack stands in the Tuchitua area, north towards Frances Lake, along the Tungsten Road, and in scattered stands west of Watson Lake.

Winter kill and **frost** damaged young lodgepole pine at a joint Canada-Sweden lodgepole pine trial at the Takhini Forest Reserve north of Whitehorse. Ongoing pine **dieback** and tree mortality at two locations was caused by several factors, primarily stand age and site limitations. Pest problems in young pine stands were few; the most notable were **Comandra blister rust**, **Western gall rust**, **needle casts** and **rodent** girdling of stems and branches.

Large aspen tortrix populations were generally low for the third consecutive year. Light defoliation was recorded in scattered immature aspen stands for 10 km between Faro and Ross River. An **aspen dieback** and a previously unknown **aspen leaf spot** caused crown thinning, poor leaf development and foliar discoloration at several locations throughout the Yukon Territory. Seven tree diseases were recorded by FIDS in the Yukon for the first time, three on conifers and four on deciduous trees; these represent six **new host** and three **new distribution records**.



Map 1. Areas where one or more forest insect and disease samples were collected and pheromone-baited traps located in 1987.

SPRUCE PESTS

Spruce budworms
Choristoneura spp.

For the second consecutive year, eastern spruce budworm, *C. fumiferana*, lightly and moderately defoliated mainly white spruce over at least 1000 ha in the La Biche River valley, in the extreme southeast corner of the Territory. Four areas of light defoliation totalling 750 ha and two areas of moderate defoliation over 250 ha were mapped August 4 during an aerial survey from Fort Nelson, B.C. Defoliation continued up the La Biche River Valley, but surveys were limited due to fuel constraints. The Yukon infestation is a small extension of a major outbreak which defoliated about 58 500 ha, primarily in the Liard and Fort Nelson river valleys in B.C. and continued into the Northwest Territories.

Based on historic patterns and the apparent health of B.C. larval populations, defoliation is expected to recur in 1988.

For the fourth time since 1983, adult male populations of the two principal species of budworm, *C. orae* and *C. fumiferana*, were monitored with pheromone traps near Watson Lake (Table 1). The trapping program provides information on the distribution and fluctuation of populations over time. No distribution patterns have emerged from the data collected.

Table 1. Average numbers of two species of spruce budworm caught in pheromone-baited sticky traps near Watson Lake from 1983-1987, Yukon Territory.

Pheromone (5% conc.) type and budworm species	1983	1984	1986	1987
A (acetate) *C. orae*[1]	95	44	96	0
B (aldehyde) *C. fumiferana*[2]	95	81	54	94

[1]Chemicals used are - trans-11-tetradecenyl + cis-11-tetradecenyl + trans-11-tetradecenol

2 " " " - trans-11-tetradecenal + cis-11-tetradecenal

Two factors which may have influenced the negative results in the *C. orae* traps were low populations, or the possibility of a two-year cycle population. Attempts to collect *Choristoneura* spp. larvae by standard beating samples near Watson Lake and Haines Junction were unsuccessful, probably because of low populations. These collections were requested by Dr. G.T. Harvey of the Great Lakes Forestry Centre (in Ontario) after high numbers of adults of both species were trapped during the summer of 1986. Spring weather, particularly in the southeastern portion of the Territory, was unseasonably cool and may have contributed to the negative collections. Further larval collections will be attempted in 1988.

Spruce beetle
Dendroctonus rufipennis

In response to concerns by the Yukon Forest Service about a possible spruce beetle infestation, FIDS conducted surveys in the vicinity of a 1982 mudslide in Kusawa Lake Park which killed mature spruce over several hectares. Surveys were conducted along the fringe of this area, in adjacent campsites and on log decks left from the general cleanup. A few adult beetles were found in one standing spruce attacked in 1987, larvae and pupae were present in several one-meter long bolts of firewood stacked in one of the campsite areas, and there was evidence of old attack in the log decks. These findings indicate an endemic rather than epidemic beetle population. High numbers of an engraver beetle, *Ips tridens*, were found in both firewood bolts and standing dead trees in the area, but they generally do not pose a threat to healthy trees. An aggressive sanitation program involving bark removal and destruction of infested material being implemented during the fall and winter of 1987-88 should minimize the risk of an infestation.

Spruce beetle outbreaks in the Yukon are usually associated with trees predisposed by road construction, flooding or windthrow. Assessments of beetle populations will continue in 1988.

Spruce broom rust
Chrysomyxa arctostaphyli

This disease is the most widespread, chronic problem affecting white and black spruce throughout their range in the Yukon. Perennial brooms were evident particularly in mainly mature trees in the area between Teslin and Tagish, along the Robert Campbell Highway, between Mayo and Elsa, and along the South McQuesten River road. The infected alternate host, kinnikinnick, (*Arctostaphylos uva-ursi*) was collected between Tagish and Carcross.

A study on the impact of the rust on white spruce by the Forest Insect and Disease Survey of the Canadian Forestry Service in 1976-77 found radial increment loss of up to 20% per year when three or more brooms were present on a tree. Heavy brooming also causes top-kill, broken or multiple tops and dead branches. The dead and broken tops and branches create infection centres for decay organisms, such as *Fomes pini*.

Spruce needle blight
Lirula macrospora

This needle blight lightly infected older foliage on most of the immature white spruce in the Tagish Flats area between Tagish and Carcross, and on 50% of the white spruce along the Nordenskiold River, south of Carmacks. Infected needles turn reddish-brown after the second year of infection and remain on the tree for several years until they are weathered off. Repeated severe infections of this needle blight, considered a serious disease of Norway spruce in Europe, can cause reduction in tree increment by reducing photosynthetic capacity.

Joint Canada-Sweden lodgepole pine trial

In co-operation with a Canada-Sweden interagency project, pest conditions in a one-year-old lodgepole pine trial located at the Takhini Experimental Forest Reserve north of Whitehorse were evaluated by the Forest Insect and Disease Survey of the Canadian Forestry Service in late June. Lodgepole pine, Scots pine, Siberian larch and Norway spruce were also planted at this site.

At least 75% of the lodgepole and Scots pine suffered severe bud and foliage damage as a result of winter kill. Early frost and low snow levels accompanied by alternate thawing and freezing during the winter caused the damage. The same conditions killed 90% of Norway spruce and top-killed 100% of Siberian larch in this plantation. A weakly parasitic fungus, Sclerophoma pithyophila, usually associated with drought or frost-killed tissues, was isolated from affected lodgepole pine. The damage will result in stunted bushy growth for several years on those trees top-killed. Significantly, natural lodgepole pine regeneration within the experimental plot was not damaged.

This plantation was established in 1986 as a trial to test the disease resistance of lodgepole pine. The trees were grown from seed produced in Swedish seed orchards established using northern latitude provenances from B.C. and the Yukon. The Takhini Reserve site is the most northerly of 5 sites located in the Pacific Region, and the only one located north of 60° latitude. Assessments of pest conditions in this experimental plantation will continue.

Unknown pine dieback and mortality

Significant dieback and mortality of mature lodgepole pine was examined in two locations along the Lower Canol Road south of Quiet Lake, and along the Ethel Lake Road. No single cause was identified. The dieback appeared to be an ongoing process, not the result of a recent occurrence. Several factors have contributed to the general decline of lodgepole pine in these areas including over-maturity, site and soil limitations, competition and succession. A root rot, Inonotus (Polyporus) tomentosus, was isolated on sammples from the Ethel Lake road, and a brown cubical rot, Serpula himantioides, was isolated from samples collected near Sidney Creek on the Lower Canol road. This collection represents a new host and distribution record for the Yukon. There was also evidence of old, secondary bark beetle attacks on the lower boles of several trees at both locations; however, no adults or larvae were found.

Pinewood nematode and woodborers Bursaphelenchus xylophilus

Eighteen adult woodborers, primarily Monochamus scutellatus, suspected to be vectors of the nematode, were collected at Hyland Forest Products log sort yard at Watson Lake in late June. This collection is part of a nation-wide survey to determine the distribution of the nematode in Canada. A native insect or bacterial feeding Bursaphelenchus sp. not B. xylophilus, was isolated from three of the woodborers.

The pinewood nematode is responsible for widespread pine mortality in Japan. Scandinavian countries may impose embargoes on some imported green Canadian wood products which might contain the nematode.

Squirrel cone stripping

Damage caused by squirrels stripping cones from lodgepole pine was not seen in the southern Yukon Territory in 1987. The only signs of the significant damage first seen in 1986 was some one-year-old flagging and branch dieback between Watson Lake and Jakes Corner.

Pests of young lodgepole pine stands

Stem rusts and needle casts were the most common pests in four naturally regenerated young lodgepole pine stands examined in the southern part of the Territory in 1987. The surveys concentrated on the occurrence of insect and disease problems that could adversely affect growth and yield; results are summarized in Table 2.

Table 2. Pests of young lodgepole pine stands, Yukon Territory, 1987.

Location	Pest	Remarks
1 km west of Rancheria River bridge on Alaska Hwy.	Western gall rust, Endocronartium harknessii	<5% of stand infected, branch and stem galls
	Rodent feeding	Feeding on rust cankers, causing branch and stem girdling
Highway 7, 2 km north of B.C.-Yukon border	Comandra blister rust, Cronartium comandrae	1% of stand infected, branch and stem cankers
Highway 9, 10 km north of Watson Lake	Pine needle cast, Lophodermella concolor	Moderate infection on 25% of young trees
Takhini Forest Reserve, north of Whitehorse on Highway 2	Comandra blister rust, Cronartium comandrae	1% of stand infected, branch and stem cankers
	Pine needle cast, Lophodermella concolor	Light infection, low incidence
	Winter flecking	Light infection, low incidence

LARCH PESTS

Larch sawfly
Pristiphora erichsonii

Increased larch sawfly populations infested scattered, mainly immature tamarack stands in the Tuchitua area, north towards Frances Lake and northeast along the Tungsten Road. Adults and eggs laid in niches cut in the tender young lateral shoots were found in early July. Because aerial surveys were not conducted, the extent and severity of defoliation was not determined. By late summer, light to moderate defoliation was reported in scattered tamarack stands west of Watson Lake.

In 1984-85, larch sawfly defoliation was reported in the Simpson Lake area and in the La Biche River Valley. Populations will be assessed again in 1988.

DECIDUOUS TREE PESTS

Large aspen tortrix
Choristoneura conflictana

Scattered immature trembling aspen stands were lightly defoliated for ten kilometers between Faro and Ross River on the Robert Campbell Highway. There was no evidence of the pest elsewhere in the Yukon. In 1984 tortrix defoliated trembling aspen over some 6 400 ha; populations declined in 1985, and have remained at low levels since.

Diamond willow disease
Valsa (*Cytospora*) sp.

Diamond-shaped willow cankers were common throughout the range of willow trees in the southern Yukon. A species of *Valsa* (*Cytospora*), a parasitic microfungus suspected to be the causal agent, was isolated from a sample taken at Teslin. It was not isolated from samples from Big Creek and the South McQuesten River. Surveys to collect the causal agent will continue in 1988.

An aspen leaf spot
Pollaccia sp.

This undescribed species was found for the first time in the Yukon on trembling aspen, representing a new host and distribution record. Infected foliage confined mainly to understory trees, was common along the Klondike Highway from west of the South McQuesten River to the Carmacks area and southwest of Watson Lake. Small, necrotic lesions form on infected foliage and eventually enlarge, causing the leaf to wilt and die. Further surveys and collections will be made in 1988 in order to facilitate research on this new disease.

An aspen dieback

Most trembling aspen on southwest-facing slopes along the east shore of Little Atlin Lake and on south-facing slopes between Tagish and Carcross exhibited thin crowns and poorly developed foliage with necrotic margins. Infection in stands near Little Atlin Lake resembled Venturia sp., a blight of trembling aspen; however, samples did not contain identifiable fruiting bodies, so this diagnosis was not confirmed. Extreme weather conditions such as late frosts could be the causal agent.

MULTIPLE HOST PESTS

Climatic injury

Winter drying or 'red belt' discoloured mostly older foliage on pine and some spruce along southwest-facing, mid-slope locations south of Watson Lake near the Yukon-B.C. border. Similar damage was reported in the Meister River area, northwest of Watson Lake.

Sudden thaws and warmer weather in spring stimulate physiological processes within the tree, resulting in moisture loss from the foliage through transpiration. Because the ground water is still frozen this moisture cannot be replaced and needles, primarily in the crown fringes, desiccate and die. Unless this problem recurs in successive years, trees normally refoliate and recover the following year.

Table 3. Other noteworthy insects and diseases in the Yukon Territory, 1987.

Causal Agent	Host	Locality	Remarks
Aspen dieback, Tympanis sp.	Trembling aspen	Swift River	New host record. Causing dieback and crown thinning over 1 ha
Lightheaded aspen leafroller, Anacampsis niveopulvella	Trembling aspen	Between Faro and Ross River on Robert Campbell Highway	Associated with large aspen tortrix
Aspen serpentine leafminer, Phyllocnistis populiella	Trembling aspen	South of Watson Lake near B.C./Yukon border	Light infestation on 50% of trees
Cooley spruce gall adelgid, Adelges cooleyi	White spruce	South end of Aishihik Lake	Low incidence, light intensity
Dieback fungus, Mycosphaerella sp.[1]	European mountain ash[2]	Takhini Forest Reserve	New host record

Causal Agent	Host	Locality	Remarks
Dieback fungus, *Nectria cinnabarina*[1]	European mountain ash[2]	Takhini Forest Reserve	New host record
Dieback fungus, *Sclerophoma*[1] *pithyophila*	Balsam fir[2]	Takhini Forest Reserve	New host record
Engraver beetle, *Ips tridens*	White spruce	1 km east of Liard River on Alaska Highway	Moderate attack on windthrown trees
Fir-blueberry rust, *Pucciniastrum goeppertianum*	Alpine fir	Lower Canol Road	Common on understory trees
Nelson's juniper rust, *Gymnosporangium nelsonii*	Creeping juniper	5 km south of Jakes Corner on Highway 7	New distribution record. First collection in Yukon Territory
Poplar borer, *Saperda calcarata*	Trembling aspen	Between Stewart Crossing and Mayo	Occasional trees infested
Spruce shoot rust, *Chrysomyxa woroninii*	White spruce	Lower Canol road	Light infection on few trees
Winter flecking	Jack pine[2]	Takhini Forest Reserve	Causing foliar discoloration, low incidence

[1]A parasitic microfungus

[2]Exotic species not native to the Yukon Territory

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