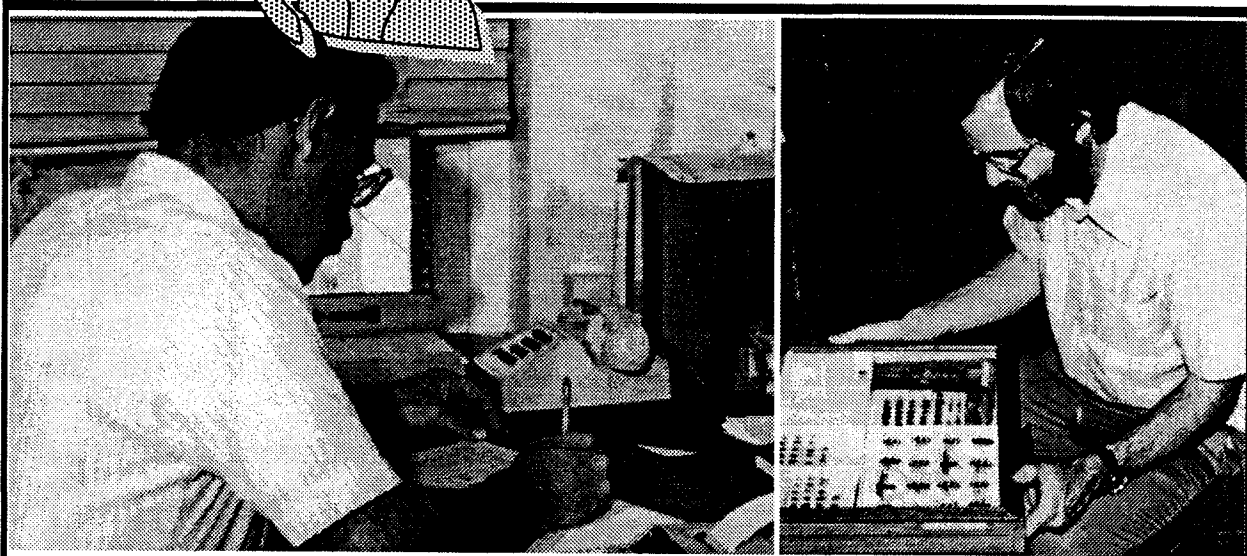


Forest Insect and Disease Conditions

Yukon Territory
1991

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Forestry Canada Forêts Canada

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The following Appendix is available on request from the Forest Insect and Disease Survey, Forestry Canada, 506 West Burnside Road, Victoria, B.C. V8Z 1M5.

I. Summary of Svenska Cellulose lodgepole pine trials in B.C. and the Yukon.

INTRODUCTION

This report summarizes forest insect and disease conditions in the Yukon Territory in 1991. Pests are listed by host with emphasis given to those capable of sudden damaging outbreaks.

During the 13-day survey in late June and early July, over 60 insect and disease collections were made at permanent sample sites and pest-affected stands (Map 1) throughout the southern Yukon.

Yukon Forest Service staff were contacted at Whitehorse, Mayo and Watson Lake. A meeting with headquarters staff was held at Whitehorse to inform them of Forestry Canada-FIDS work plans, and to exchange information with regard to current forest pest activities. Contact was made and program information exchanged with administrative and field staff at Kluane National Park headquarters at Haines Junction, and with field personnel at the University of Calgary Arctic Institute at Kluane Lake.

Forest Insect and Disease Survey (FIDS) is a nation-wide network within Forestry Canada with the responsibility of: (1) producing an overview of forest pest conditions and their implications, including predictions where possible; (2) maintaining records and surveys to support quarantines; (3) supporting forestry research with records, herbaria and insectary collections; (4) providing advice and extension on forest insect and disease conditions; (5) developing and testing survey techniques; (6) and conducting related biological and impact studies.

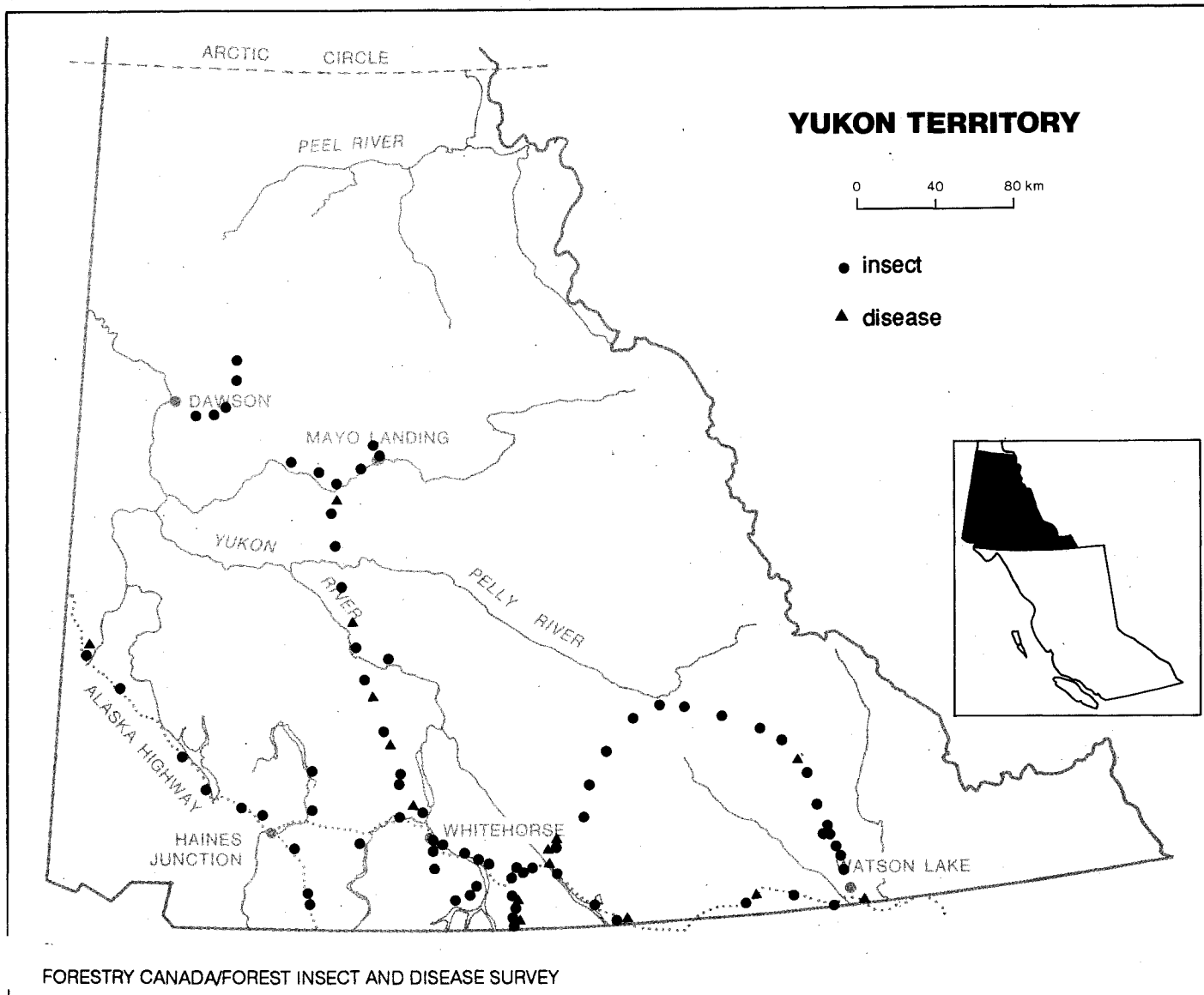
From October to June, correspondence and inquiries with respect to forest pest problems in the Yukon can be directed to the Forest Insect and Disease Survey (FIDS) headquarters at:

Pacific Forestry Centre
Forestry Canada
506 West Burnside Road
Victoria, B.C.
V8Z 1M5 Ph. 363-0600

and from June to October at:

Forest Insect and Disease Survey
Forestry Canada
P.O. Box 2259
Smithers, B.C.
VOJ 2N0 Ph. 847-3174

Detailed copies of maps, pest reports, leaflets and monographs, as well as regional pest histories, are available from the above addresses.



Map 1. Locations where trees were sampled and pest surveys conducted. Yukon Territory 1991

SUMMARY

Eastern spruce budworm populations decreased in the Liard River drainage. **Spruce beetle** populations remained low and no outbreaks or mortality were reported.

A **pine needle cast** lightly infected year-old needles of lodgepole pine near Frances Lake causing premature needle loss. **Lodgepole terminal weevil** was found for the second consecutive year near Watson Lake. **Frost and rodent feeding** damaged young lodgepole pine and Siberian larch in a growth trial near Takhini.

Populations of **larch sawfly** remained low, causing only trace defoliation of tamarack in the southeast.

For the fourth consecutive year **large aspen tortrix** populations caused widespread, though mainly light defoliation of trembling aspen. Most of the damage this year occurred in scattered stands between Haines Junction and Teslin.

Climatic factors such as winter **cold** and **drought** have contributed to the dieback of white spruce and the loss of needles by a number of coniferous species at widespread locations throughout the Territory.

Branch tip mortality caused by the stripping of immature cones by **squirrels** was common in the southeast. The girdling of young pine near Johnsons Crossing and Takhini was attributed to feeding by **snowshoe hares**.

An annual pest survey within joint Canada-Sweden co-operative growth trial at Takhini found lodgepole pine and Siberian larch to be further damaged by a combination of **frost** and **hare feeding**.

A table noting minor yet noteworthy pest incidences is included in this report.

SPRUCE PESTS

Eastern spruce budworm, Choristoneura fumiferana

Aerial surveys conducted to map budworm defoliation of white spruce in the Liard and Fort Nelson river drainages in the northern Fort Nelson Forest District, found damage to be considerably reduced this year. Though no aerial surveys were conducted in the La Biche River Valley in the extreme southeast corner of the Yukon, populations have historically risen and fallen in synchrony with those in the Liard.

Defoliation by spruce budworm can cause growth loss and repeated severe defoliation can cause branch mortality and top-kill.

PINE PESTS

A pine needle cast, Lophodermella concolor

An average of 80% of the 1990 foliage was killed on 90% of the understory lodgepole pine, 5 km east of Watson Lake along the Alcan Highway. Overstory trees were only lightly infected. Localized infections of Hendersonia pinicola in association with L. concolor killed an average of 20% of the 1990 needles (up to 90%) in understory fringe trees, 10 km north of Watson Lake along the Robert Campbell Highway. On some trees, repeated infections had resulted in "lions tails", and only the current foliage remained on the branch tips.

Repeated severe infections can result in a considerable loss of growth potential.

Lodgepole terminal weevil, Pissodes terminalis

A single killed leader containing weevil larvae was found in a young lodgepole pine stand north of Watson Lake. This is the northern-most distribution record for this insect and is only the second time (the first being in 1990) the insect has been found in the Yukon.

The weevil attacks developing terminals killing them down to the first branch whorl. High incidences and repeated attacks over time can result in significant growth loss, but damage on this scale is not anticipated in the Yukon.

LARCH PESTS

Larch sawfly, Pristiphora erichsonii

Larch sawfly populations in tamarack remained low after declining significantly in 1990. Early season examinations were conducted in late June to determine the frequency of oviposition in elongating lateral shoots. In stands along Hwy. 37 near the B.C.- Yukon border, an average of 2% of the shoots of all understory trees was crooked due to oviposition. In stands along the Robert Campbell Hwy. north of Watson Lake, only small numbers of branches were attacked on between 1 and 10% of the trees.

Larvae that hatch from a single oviposition site can defoliate one or more branches before reaching maturity, and even such a low frequency of oviposition as seen in the border stands can result in trace-to-light defoliation on immature and understory trees. Severe defoliation can result in significant loss of growth potential. No noticeable damage is expected in stands north of Watson Lake. Historical fluctuation patterns suggest that populations will remain low in 1992.

SPECIAL DIRECTED SURVEY**Joint Canada-Sweden lodgepole pine trial**

Pest conditions in the 5-year-old lodgepole pine trials in the Takhini Forest Reserve were evaluated by FIDS during the annual Yukon survey.

Survival in the replicates of lodgepole pine was very uniform in the interior of the plantation with an average of 6% mortality (range 5-9%), most of which occurred in the first few years due to planting shock and winter cold. Around the perimeter however; particularly the western edge, the stems of up to 60% of trees had been clipped by snowshoe hares, and, although the trees remained alive, in many instances only the bottom whorl of branches remained.

In the four replicates of Siberian larch an average of 22% of the trees had died (range 9-33%). As with the pine, mortality was due primarily to harsh climatic factors with the size and vigour of the trees severely limited by hare feeding damage. After five growing seasons, the average height of the surviving larch seedlings was only 10 cm.

This is the most northerly of five experimental plantations established in the Pacific Region in co-operation with Svenska Cellulose, a Swedish forest company. Lodgepole pine in the plots were grown from seed produced in Swedish seed orchards. The parent trees were in turn grown from seed which originated from various northern B.C. provenances. The purpose of the trials is to determine how the trees, one generation removed from their native environment, respond when reintroduced. Pest conditions at the plot will be re-assessed in 1992.

MULTIPLE HOST PESTS

Winter damage

Winter cold and wind desiccation are two of the most common and consistent agents of damage in Yukon forests. The damage can be expressed in many ways, from needle discoloration to top and branch dieback and full tree mortality.

For at least five years, white spruce decline has been an evident and expanding problem in a number of locations within the Territory. Approximately 10% of all age class spruce along Little Atlin Lake, stretching south into B.C. were in varying stages of decline, with some scattered mortality comprising approximately 1% of the trees. Identical symptoms were intermittently evident in roadside spruce along the Alcan Highway from Burwash Landing to Beaver Creek and along the Klondike Highway from north of Stewart Crossing to Carmacks. The decline has been slow and progressive, with the browning and shedding of needles beginning in the upper crowns and branch tips. Samples sent to PFC for analysis failed to reveal signs of any insect or disease activity and damage is thought to be a result of combined drought and winter climatic stress.

Physical damage to foliage resulting from winter cold was common and widespread throughout the Yukon. The most severe damage, most likely caused by cold desiccating winds, discolored the entire crowns of over 500 young lodgepole pine in 10 or more small patches on high rocky outcrops above the east side of Little Atlin Lake. The trees are not expected to recover. Winter drying caused the discoloration of about 5% of the needles of the larger lodgepole pine in a plantation in the Takhini Forest Reserve. The damage had been caused by a southerly wind since only needles on the south side of the trees were affected.

"Winter flecking" discolored an average of 40% (range 10-80%) of the older needles on lodgepole pine for 5 km, centred at km 1367 of the Alcan Highway. The damage is thought to be connected with reflected light passing through frozen water droplets on the needles, but no direct cause-effect relationship has yet been determined.

An average of 10% (up to 60%) of the needles on 20% of the alpine fir were winter-killed along the Canol Road in a localized area 2 km north of Johnsons Crossing.

Late spring frosts killed an average of 10% of the newly flushed foliage on eastern larch along the Robert Campbell Highway, 20 km north of Watson Lake.

Mammal damage

Next to the climate, the most prevalent and damaging pests in the Yukon are the small mammals such as the snowshoe hare, squirrel and vole.

Snowshoe hares girdled 300+ roadside sapling-sized lodgepole pine along the Canol Road just north of Johnsons Crossing and along adjacent stretches of the Alcan Highway. In a few localized areas up to 80% of the trees were killed. Hares also caused scattered mortality of pine in a large uniform young stand along both sides of the Klondike Highway near Lake Laberge, including some damage to trees within the Takhini Forest Reserve. Up to 30% of young aspen were girdled in a stand just south of Stewart Crossing and at Fox Lake.

Lodgepole pine branch tip and occasional terminal mortality was seen in young stands near Lake Laberge and from Swift River to Watson Lake, wherever pine predominated. The reddened tips resulted from immature cones being stripped by squirrels in the early spring, girdling the stems and killing the distal growth. The damage was highly visible early in the season especially in stands near Swift River where 10 or more branch tips were killed on some trees, and up to 50% of the trees supported damage.

Vole damage was minimal due to a recent collapse in the population but characteristic shallow tunnels were seen associated with light feeding damage to lodgepole pine regeneration near km 1367 of the Alcan Highway. Populations are cyclic and are expected to remain low for the next few years.

DECIDUOUS TREE PESTS

Large aspen tortrix, Choristoneura conflictana

Large aspen tortrix populations remained at moderately high levels, causing mostly light defoliation of trembling aspen over a broad area. There was however, a significant decline of visible defoliation in and around the City of Whitehorse. Though no aerial survey of tortrix defoliation was conducted, ground surveys recorded current feeding damage in patches from Teslin as far west as the Takhanne River crossing along the Haines Road. Severe defoliation was seen in only two patches totalling about 30 ha just east of Tagish along Highway 8, and a 10 ha patch along the Alcan Highway at Marsh Lake. Primarily light defoliation with some patches of moderate occurred; over a broad area between Carcross and Tagish, along the Alcan Highway between Jakes Corner and Whitehorse, and from the Takhini River crossing to beyond Fox Lake. Smaller areas of light patchy defoliation were seen farther west near Champagne, Aishihik, Haines Junction, and from Dezadeash Lake south to the B.C. border.

Up to 10% of the rolled leaves examined at Takhini contained only larval head capsules, possibly indicative of predation, and a further 5% of the larvae supported the egg masses of a tachinid parasite. A mass larval collection from the same area was found to be 33% parasitized; 27% by Diptera spp, and 6% by Lepidoptera. In this and most other areas, insect development was distributed among all stages beyond mid-larval instar, including pupae, and many empty pupal cases (from which adults had presumably emerged) were also seen.

A variety of other insects were found associated with the tortrix infestation, some contributing in a minor way to the damage to the aspen foliage. These included: an aspen leaf beetle, Chrysomela falsa; the aspen serpentine leafminer, Phyllocnistis populiella; the paleheaded leafroller, Anacampsis niveopulvella; poplar leafrolling sawfly, Phyllocolpa bozemani and bladder gall mites, Eriophyes sp. Also common were unidentified small green aphids and leafhoppers.

Defoliation by the tortrix commonly causes some loss of growth potential and may, following successive years of severe defoliation, kill trees or tops. The current infestation is expected to continue in 1991 and FIDS staff will continue to monitor large aspen tortrix populations in 1991.

OTHER NOTEWORTHY PESTS

Table 1. Other noteworthy pests, Yukon Territory, 1991.

Host/Pest	Location	Remarks
<u>White Spruce</u>		
Giant conifer aphid <u>Cinara</u> sp.	Whitehorse area	common in high numbers on native and ornamental spruce
Pine leaf adelgid <u>Pineus pinifoliae</u>	Km 30 Robert Campbell Hwy.	avg. <5% of branch tips with galls
Spruce broom rust <u>Chrysomyxa arctostaphyli</u>	Yukon Territory	common and widespread within host range
A spruce scale <u>Physokermes hemicryphus</u>	Little Atlin Lake	common in all age classes but causing little damage
Spruce gall adelgid <u>Adelges lariciatus</u>	Km 10 Robert Campbell Hwy.	avg. 10% of branch tips infested on 50% trees
A spruce budmoth <u>Zeiraphera fortunana</u>	south Yukon	common in standard three-tree beatings, but populations remain below damage threshold
<u>Lodgepole pine</u>		
Fir coneworm <u>Dioryctria abietivorella</u>	Km 20 Robert Campbell Hwy.	killed the tops of four young trees
Gouty pitch midge <u>Cecidomyia piniinopis</u>	Robert Camp- bell Hwy.	light incidence of crooking on branch tips

Pest	Location	Remarks
A leaf beetle <u>Syneta carinata</u>	Km 30 Robert Campbell Hwy.	light defoliation of new shoots on 50% trees - localized
Western gall rust <u>Endocronartium harknessii</u>	Watson Lake	moderate incidence, light intensity
<u>Eastern larch</u>		
Tomentosus root rot <u>Inonotus tomentosus</u>	km 100 Robert Campbell Hwy.	single mature tree killed, two dying - new host record
<u>Deciduous</u>		
Aspen leaf beetle <u>Chrysomela falsa</u>	Carcross	feeding gregariously on aspen leaves - light damage
Aspen serpentine leafminer <u>Phyllocnistis populiella</u>	Whitehorse area	light leafmining on aspen
Birch leaftier <u>Apostomis</u> or <u>Nites</u> sp	Mayo	avg. 10% of leaves tied on all white birch in area
A gall mite <u>Eriophyes parapopuli</u>	Whitehorse area	widespread light galling of aspen leaves
Paleheaded aspen leafroller <u>Anacamptis niveopulvella</u>	Carcross	light aspen defoliation in association with <u>C. conflictana</u>
Poplar leaf-folding sawfly <u>Phyllocolpa</u> sp	Jakes Corner, Judas Creek	average 10% aspen leaves folded

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