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SURVEY BULLETIN

Forest Insect and Disease Conditions in Ontario

Spring 1984



Preparing for the field season

GREAT LAKES FOREST RESEARCH CENTRE
Box 490 • Sault Ste. Marie Ontario

FOREST INSECT AND DISEASE CONDITIONS IN ONTARIO

Spring 1984

This is the first of three bulletins issued in 1984 by the Forest Insect and Disease Survey Unit (FIDS), outlining current forest pest problems in Ontario. The second and third bulletins will be issued in August and October.

FIELD ASSIGNMENTS 1984

There have been several changes in survey field assignments this year. C.A. Barnes was promoted to Regional Supervisor, filling the vacancy created by the retirement of Harvey Weir. He has been assigned to the Fort Frances District. R.J. Sajan has been transferred from Fort Frances to Minden and H. Brodersen has moved from Chalk River to St. Williams. B.E. Smith, a new District FIDS Ranger, has filled the vacancy created by the promotion of C.A. Barnes and has been assigned to Chalk River.

A complete list of survey field staff and their field addresses is given below:

Region

Northwestern	C.A. Barnes	210 Butler Ave. Fort Frances, Ontario P9A 2N7 (807) 274-6821
	D.C. Constable	R.R. #1, Site 25 P.O. Box 9 Sioux Lookout, Ontario POV 2T0 (807) 737-3630
North Central	W.D. Biggs	R.R. #6, Stn. "F" Thunder Bay, Ontario P7C 5N5 (807) 577-8612
	V. Jansons	Box 495 Geraldton, Ontario POT 1M0 (807) 854-1317

Northern	L.S. MacLeod	Box 267 Temagami, Ontario POH 2H0 (705) 569-3467
	A.J. Keizer	Box 817 Chapleau, Ontario POM 1K0 (705) 864-1042
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Northeastern	M.J. Thomson	P.O. Box 490 Sault Ste. Marie, Ontario P6A 5M7 (705) 949-9461
	E. Czerwinski	S.S. #1, Site 5 P.O. Box 7 Sudbury, Ontario (705) 674-0453
Algonquin and Eastern	R.J. Sajan	c/o OMNR Minden, Ontario KOM 2K0 (705) 286-2650
	B.E. Smith	PNFI Chalk River, Ontario KOJ 1J0 (613) 589-2932
	W.A. Ingram	P.O. Box 1150 Kemptville, Ontario KOG 1J0 (613) 258-5664
Central and Southwestern	H.J. Evans	P.O. Box 100 Angus, Ontario LOM 1B0 (705) 424-5721
	H. Brodersen	P.O. Box 148a St. Williams, Ontario NOE 1P0 (519) 586-2041

SPECIAL SURVEYS OF WHITE PINE AND BLACK SPRUCE PLANTATIONS

As part of a continuing program to gather baseline data on pests affecting important tree species in Ontario, the FIDS Unit carried out a special survey of white pine plantations in southern Ontario and black spruce plantations in northern Ontario during the 1983 field season. This was a repetition of surveys carried out in 1980. Results are presented below.

WHITE PINE PLANTATIONS

In this survey, technicians examined 6,300 trees in 42 separate plantations. The plantations were grouped in three height classes: < 2 m, 2 m - 6 m, and > 6 m.

Insects

The most abundant and serious insect encountered was the white pine weevil (*Pissodes strobi* [Peck]) which was found in 25 of the 42 plantations and affected 6.8% of the trees examined. This was a slight decline from the 8% recorded in the 1980 survey. Most of the infested trees were under 6 m in height. The most severe damage was recorded in Foster Township, Espanola District where 60% of the trees were infested.

The pine bark adelgid (*Pineus strobi* [Htg.]) was the second most abundant insect. It was found on 5.4% of the trees examined, a notable decline from 1980 when it was observed on 12% of the trees. It was found on trees of all size classes and was present in 50% of the plantations.

The third insect found in relative abundance was the pine spittlebug (*Aphrophora cribrata* [Walker]). It occurred in 21 plantations in 1983 in comparison with eight in the 1980 survey. However, it attacked fewer trees in 1983--4.1% of the total, in comparison with 7% of the total in 1980. Most of the trees attacked were about 6 m in height except in one plantation in Edwardsburgh Township, Brockville District, where 23% of the 15 m trees were attacked. Damage in all cases was insignificant.

The pine false webworm (*Acantholyda erythrocephala* [Linn.]) attacked 193 trees in 1983 in comparison with 23 in 1980; however, only four plantations were affected. Three of these were in the Central Region, with the most serious damage occurring in Bexley Township, Lindsay District, where 88% of the trees were affected, and defoliation averaged 46%.

Numerous other insects were encountered in the course of the survey: the eastern pine shoot borer (*Eucosma gloriola* Heinr.) (nine

plantations), the webbing coneworm (*Dioryctria disclusa* Heinr.) (one plantation), the introduced pine sawfly (*Diprion similis* [Htg.]) (two plantations), the gypsy moth (*Lymantria dispar* [Linn.]) (one plantation), the northern pine weevil (*Pissodes approximatus* Hopk.) (one plantation), the pitch mass borer (*Synanthedon pini* [Kell.]) (one plantation), and the white pine needle sheathmite (*Trisetacus alborum* Keifer) (two plantations).

Diseases

The most important disease encountered in the survey was white pine blister rust (*Cronartium ribicola* J.C. Fisch.). The disease was found on 96 trees (1.5% of the total) and of these, 52 (0.8%) had stem cankers. This compares with a total of 198 trees (3.3%) infested in 1980, of which 96 (1.6%) had stem cankers.

In the 1983 survey the highest incidence of the disease was in a 12 m plantation in the Parry Sound District where 14.7% of the trees were infected.

Foliar damage caused mainly by abiotic agents such as winter drying and needle droop was present in 36% of the plantations examined. The needle cast fungi *Lophodermium* sp. and *L. nitens* Darker were each found in one plantation.

Armillaria root rot and basal stem cankers, which had been caused by a number of abiotic agents, were found in two and five plantations, respectively.

Semimature tissue needle blight, which is caused by air pollution, usually sulphur dioxide or ozone, was collected in two plantations in 1980 but was not encountered in the 1983 survey.

BLACK SPRUCE PLANTATIONS

A survey of high-value black spruce plantations was the northern Ontario counterpart of the white pine plantation survey in southern Ontario. A total of 5,700 trees were examined in 38 plantations. These plantations were also grouped in the < 2 m, 2 - 6 m and > 6 m height categories.

Insects

The spruce budworm (*Choristoneura fumiferana* [Clem.]) was the most frequently encountered insect, although populations were considerably lower than those observed in the 1980 survey. A total of 362 trees were attacked by the insect in 1983 in comparison with 1,631

trees in 1980. The budworm was found in nine plantations in 1983, in comparison with 19 in 1980. Most of the affected plantations were located in northwestern Ontario. This probably reflects the Ontario budworm situation in 1983, with populations on the decline in the eastern part of Ontario and increasing markedly in northwestern Ontario.

The second most abundant insect was the yellowheaded spruce sawfly (*Pikonema alaskensis* [Roh.]). It was observed in 12 plantations on a total of 128 trees, a considerable increase over 1980 when it attacked 35 trees in one plantation. Damage in all cases was minor except in Stock Township, Kirkland Lake District, where 72 of 150 trees examined were infested and defoliation averaged 37%.

Three other insects were searched for and were encountered in low numbers, causing minor damage. They were the white pine weevil (18 trees), the spruce coneworm (12 trees), and sawyer beetles (3 trees).

In addition to the insects noted above which were specifically searched for, several other insects were encountered, generally in low numbers. They were, in order of abundance, the spruce gall aphid (*Adelges strobilobius* [Kalt.]), the spruce bud midge (*Rhabdophaga swainnei* Felt), a web-spinning sawfly (*Cephalcia* sp.), the blackheaded budworm (*Acleris variana* [Fern.]) and the fir coneworm (*Dioryctria abietivorella* [Grt.]).

Diseases

Only four diseases were encountered during the survey, and none caused serious damage. These were Armillaria root rot (*Armillaria mellea* [Vahl ex Fr.] Kumm.), eastern dwarf mistletoe (*Arceuthobium pusillum* Pk.), and two spruce needle rusts, *Chrysomyxa ledi* d By. and *C. ledicola* Lagh. Of these, the needle rusts were the most abundant, infecting a total of 1,003 trees (17%). All height classes of trees were affected but defoliation was usually less than 10%, except in single plantations in the Brightsand River area of Thunder Bay District and in Floranna Township, Chapleau District, where defoliation averaged 16 and 12%, respectively.

CONE AND SEED SURVEY

In 1983, cone and seed surveys were concentrated on white pine in southern Ontario and black spruce in northern Ontario. These surveys are part of a continuing program to detect and evaluate the pest problems associated with cone and seed production on the major coniferous species in Ontario. The methods used in both surveys were similar. Each FIDS Ranger in northern Ontario attempted to make two collections of 100 black spruce cones, one from a lowland and one from an upland site. In southern Ontario each Ranger attempted to collect 100 green,

second-year white pine cones. In both cases, the cones were immediately shipped to the Great Lakes Forest Research Centre for dissection and analysis. The results of both surveys are summarized below.

White Pine

Because of a very sparse cone crop it was not possible in most cases to collect the full 100 cones. However, a total of 372 cones were collected from seven locations across southern Ontario. Of these, 22% were damaged by insects, with damage at each location ranging from 0 to 55%. Seed loss within the damaged cones ranged from 0 to 19.5% and averaged 8.0%.

The main insects encountered were the white pine coneworm (*Eucosma tocullionana* Heinr.), the white pine cone beetle (*Conophthorus coniperda* [Sz.]), the fir coneworm, the webbing coneworm (*Dioryctria disclusa* Heinr.), dipterous larvae (*Resseliella* sp.), a cone resin midge (*Asynaptera* sp.), and an unknown insect which caused slight damage to cones in three collections. Minor damage was also caused by Cecidomyid and *Dioryctria* larvae which could not be identified by species. No diseases were found on the cones examined.

Black Spruce

Collections of black spruce cones were more successful, with a total of 1,399 submitted for analysis. Forty-five percent of the cones were damaged by insects, with the proportion of damaged cones at each location ranging from 17 to 81%.

The overall seed loss within damaged cones averaged 18.6% and ranged from 4.1 to 47%. The principal agents responsible for the seed loss were the spruce cone maggot (*Hylemya anthracina* [Czerny]), the spruce cone axis midge (*Dasineura rachiphaga* Tripp), the spruce cone gall midge (*Dasineura canadensis* Felt), the fir coneworm, the spruce micro moth (*Paralobesia piceana* Free.), the white pine coneworm, and a dipterous larva (*Resseliella* sp.). Unknown lepidopterous larvae and other undetermined agents also caused significant losses at a few locations.

The only disease encountered in the survey was the spruce cone rust (*Chrysomyxa pirolata* Winst.), which was collected at one location in Geraldton District. However, only one cone was infected and seed loss within this single cone could not be determined.

SPECIAL PEST SURVEYS PLANNED FOR 1984

Cone and Seed Study

This field season cone and seed studies will concentrate on white spruce. This species was previously examined in 1981 and the results of both surveys will be compared when the current survey is completed in the fall of 1984. Each Ranger in Ontario will make three separate collections and ship the material to the Sault Ste. Marie laboratory for dissection and analysis. The first collection of 200 white spruce flowers will be made in the late flowering stage, after pollination but before conelet formation. The purpose of this collection is to determine the effect of spruce budworm and other early insects upon the flower stage of the cone crop. Two other collections of 100 cones will be made at the time when cones are still green but in the early harvest period. These cones will be assessed for the proportion of damaged cones and the proportion of damaged seeds within damaged cones as well as the identity of the causal agents.

High-value Plantation Surveys

Special surveys will be carried out in white spruce plantations across Ontario during the 1984 field season. This species was previously surveyed in northern Ontario in 1978 and throughout the province in 1981. The current effort is part of a continuing program to secure baseline data and to determine the impact of pests on various high-value coniferous species in the province. The surveys will be similar to those of other years in that each Ranger will examine six plantations, two each in the < 2 m, 2 - 6 m and > 6 m height classes. Two visits will be made to each plantation where detailed examinations will be carried out for the presence, abundance and impact of a wide variety of insect and disease pests and abiotic conditions.

Gypsy Moth Larval Trapping Program

For the second consecutive year a gypsy moth larval trapping program will be carried out as a joint program between FIDS and the Parks Branch of OMNR. FIDS rangers in southern Ontario will visit most provincial parks and deploy 10 burlap larval traps and two pheromone traps in appropriate locations in each park. Parks staff will monitor the burlap larval traps during the larval feeding period and will submit suspect larvae to the Sault Ste. Marie laboratory. Special quarantine mailing procedures will be used for shipment of suspect larvae. The Great Lakes Forest Research Centre will notify the FIDS Ranger and Parks personnel concerned of any positive catches made. The FIDS Ranger will revisit each park late in the field season to pick up the burlap traps and exposed adult pheromone traps. The program benefits both parties in that FIDS is able to carry out a much more comprehensive larval trapping

program and Parks personnel will be aware of the presence of this damaging pest at a very early stage.

Diseases New to Ontario

Several tree diseases were collected for the first time in Ontario in 1983. Leaf cast of larch (*Meria laricis* Vuill.) was collected at two locations: in Sullivan Township, Owen Sound District and in Harwick Township, Chatham District. Single plantations of European larch were affected in both instances. Needle cast of Douglas fir (*Rhabdocline pseudotsugae* Syd.) and Swiss needle cast (*Phaeocryptopus gauemanni* [Rhode] Petr.) were both collected in Christmas tree plantations in the Central Region for the first time in 1983. Swiss needle cast was found causing moderate foliar damage in Tiny Township, Huronia District and contributed to heavy needle damage in a plantation in the Pontypool area of Lindsay District. Needle cast of Douglas-fir caused heavy needle damage in the same plantation in the Pontypool area of Lindsay District. Surveys for all three organisms will be intensified this field season in order to determine their status in Ontario more accurately.

PEST REVIEW IN NORTHWESTERN REGION

A forest pest review for the Northwestern Region was held on 29 March 1984 in Dryden, Ontario. Approximately 57 personnel of the Ontario Ministry of Natural Resources, Canadian Forestry Service and the forest industry attended. Al Mathews, Regional Forester for the Northwestern Region, served as chairman and opened the meeting. Mike Waldram, a forestry specialist with the Northwestern Region, presented an overview of forest resources and management in the region. He was followed by David Constable, District FIDS Ranger, who discussed major regional pest problems, and Dr. H.L. Gross, FIDS Disease Survey Officer, who discussed pest losses. The afternoon sessions featured presentations by Dr. G.M. Howse, Head of the FIDS Unit, on spruce budworm, and by R.J. Sajan, FIDS Ranger Supervisor, on long-range insect and disease problems and plans for 1984. The pest review concluded with a panel discussion on various pest problems.

FRANK BRICAULT

It is with deep regret that we report the death of Frank Bricault on 15 May 1984. Frank was a long-time FIDS employee who joined the Department in 1946 as an Insect Ranger following service with the Royal Canadian Air Force. He worked as a Ranger in the Chapleau, Parry Sound and Cochrane districts before being transferred to the laboratory in 1955 where he performed various duties within the FIDS Unit until his retirement in July 1981. He will be sadly missed by his many friends and acquaintances.

FOREST INSECTS

Spruce budworm

Egg-mass surveys were carried out at some 595 locations across the province in the fall of 1983. The results of these surveys, which were presented in the fall Survey Bulletin, are summarized below.

The total number of egg masses increased by 61% although there were fluctuations between regions. In southern Ontario, the number of egg masses declined by 17%. This decline should be reflected in a further decrease in the area of moderate-to-severe defoliation; however, medium-to-heavy infestations will probably persist in the Algonquin Park and Parry Sound districts.

Egg-mass densities increased by 32% in northeastern Ontario although results varied from district to district. As a result, increases in defoliation are expected in the western parts of the outbreak (Wawa and Hearst districts) and in the northeastern parts (Temagami and Kirkland Lake districts). Increases are also expected in the Chapleau District where egg masses increased by 35%. Decreases are expected in the Sudbury, Espanola, Blind River and Sault Ste. Marie districts, while populations will probably hold steady in the North Bay District.

In northwestern Ontario, increases were recorded at all locations sampled, and there was an overall increase of 75%. From these results, it is expected that defoliation will increase substantially in 1984, possibly to double that of last year or more.

Spruce budworm development has varied across the province this spring. As of 18 May, reports of larval development were as follows: most larvae feeding in buds in the North Bay area; approximately 50% mining needles and 50% mining buds in the Thunder Bay and Fort Frances areas; not yet emerged from overwintering hibernacula in the Sioux Lookout area; and mining needles, flowers and buds in the Chapleau, Kapuskasing and Hearst areas. Observations indicate that balsam fir will produce a heavy flower crop this year, a situation which may be very favorable to spruce budworm development and survival.

OMNR plans to carry out control operations against the spruce budworm within a total area of 4,374 ha in the Hearst District. This includes 2,370 ha of commercial forest and 2,004 ha of high-value forests containing a moose yard, white spruce plantations and two provincial parks. Various formulations of the biological insecticide *Bacillus thuringiensis* will be used on about 89% of the areas to be treated and the remaining 11% will be treated with the chemical insecticides Matacil and Sevin-4-Oil.

Gypsy Moth

In 1983, the gypsy moth caused moderate-to-severe defoliation within an area of approximately 41,000 ha in the Eastern Region. Egg-mass surveys were carried out at a number of locations, mainly in the Kaladar area, Tweed District where large numbers of egg masses were found.

Preliminary surveys this spring revealed that gypsy moth egg masses were hatching in the Kaladar area on 11 and 12 May. Further surveys will be carried out as the larvae develop, including aerial mapping in early July when the damage caused by larval feeding is most evident.

Aerial and ground surveys will also be carried out in the remainder of southern Ontario, with particular emphasis on those areas in which significant numbers of male moths were captured in the 1983 pheromone trapping program (see fall 1983 Survey Bulletin).

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