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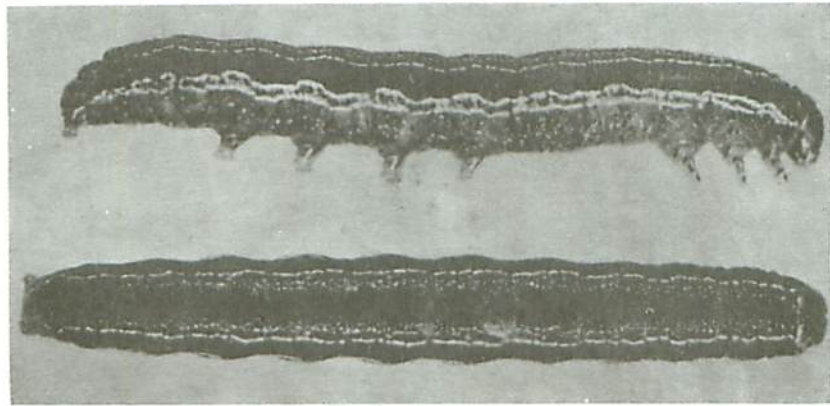
Service canadien des forêts

SURVEY BULLETIN

33241

Forest Insect and Disease Conditions in Ontario

Spring 1985



Mature larvae of the black army cutworm (*Actebia fennica* [Tausch.])

FOREST INSECT AND DISEASE CONDITIONS IN ONTARIO

Spring 1985

This is the first of three bulletins to be issued by the Forest Insect and Disease Survey (FIDS) Unit in 1985. It outlines current forest pest problems in Ontario.



C.A. Barnes

Staff of the FIDS Unit and the Great Lakes Forest Research Centre were saddened by the death of Charlie Barnes on 3 April 1985, following a lengthy illness. Charlie was a long-time FIDS ranger who joined the Unit in 1955 following service with the Royal Canadian Armoured Corps during the war years and later with General Electric in Peterborough. He carried out numerous field assignments in the Gogama, Parry Sound, Sioux Lookout, Kemptville and St. Williams work areas. Charlie was beginning his second assignment in the Fort Frances work area when he became ill in the spring of 1984. Charlie's dedication, cheerfulness and good humor will be sadly missed by his many friends and acquaintances throughout the province.

STAFF CHANGES

There were two changes in ranger field assignments this year. V. Jansons was transferred from Geraldton to Fort Frances. He will be replaced in Geraldton by Steven Payne, a new District FIDS ranger.

RANGER FIELD ASSIGNMENTS, 1985

A complete list of ranger field assignments is given below:

REGION

Northwestern	V. Jansons	210 Butler Avenue 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, Station F Thunder Bay, Ontario P7C 5N5 (807) 577-8612
	S. Payne	P.O. Box 495 Geraldton, Ontario POT 1M0 (807) 854-1317
Northern	L.S. MacLeod	P.O. Box 267 Temagami, Ontario POH 2H0 (705) 569-3467
	A.J. Keizer	P.O. Box 817 Chapleau, Ontario POM 1K0 (705) 864-1042
	C.G. Jones	P.O. Box 202 Moonbeam, Ontario POL 1V0 (705) 367-2185
Northeastern	M.J. Thomson	P.O. Box 490 Sault Ste. Marie, Ontario P6A 5M7 (705) 949-9461

(continued)

REGION (concluded)

Northeastern	E. Czerwinski	S.S. 1, Site 5 P.O. Box 7 Sudbury, Ontario P3E 1X2 (705) 674-0453
Algonquin and Eastern	R.J. Sajan	P.O. Box 550 Minden, Ontario KOM 2K0 (705) 286-2650
	B.E. Smith	Petawawa National Forestry Institute 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 148 St. Williams, Ontario NOE 1P0 (519) 586-2041

SPECIAL SURVEY OF WHITE SPRUCE PLANTATIONS

This survey was carried out in 1984 as part of a continuing program to assess the effects of various pests on the more important coniferous tree species of Ontario. For the purposes of the survey, plantations or high-value stands were grouped in three height classes: <2 m, 2 m-6 m, and >6 m. All together, some 10,500 trees were examined in 70 plantations across the province.

RESULTS - Insects

The most important and abundant insect recorded in the survey was the spruce budworm (*Choristoneura fumiferana* [Clem.]). It was found in 47 plantations, infesting 2,571 trees or 24.5% of the total. The majority of these plantations, including the most heavily infested, were

located in the Northern, Northeastern and North Central regions. The spruce coneworm (*Dioryctria reniculelloides* Mut. & Mun.) sometimes feeds in conjunction with the spruce budworm, and since the damage caused by this insect is similar, it must be grouped with that of the spruce budworm. The coneworm was encountered on 241 trees or 2.3% of the total. Combined defoliation by the two insects averaged 7% per infested tree.

Spruce budmoths (*Zeiraphera* spp.) were the second most abundant insect. They were found in 27 plantations, infesting 1,273 trees or 12.1% of the total. Most of the infestations were in the Northwestern, Northern, Algonquin, Central and Southwestern regions.

The third most abundant insect was the yellowheaded spruce sawfly (*Pikonema alaskensis* [Roh.]). This defoliator was recovered from 21 plantations, and damaged 395 trees, or 3.8% of the total. In most cases defoliation caused by larval feeding was less than 10%; however, at one location in the Northwestern Region, defoliation of infested trees averaged 32%.

The other major insect encountered in the survey was the white pine weevil (*Pissodes strobi* [Peck]), which was found in 10 plantations infesting 19 trees, or 1.8% of the total. In addition to the insects noted above, 14 other insect pests were encountered in the survey, but damage in all cases was minimal.

RESULTS - Diseases

Very little serious damage by forest diseases was encountered during the survey. The most abundant diseases were the spruce needle rusts (*Chrysomyxa ledi* [Alb. & Schw.] d By. and *C. ledicola* Lagh.). These were found on 1,713 trees, or 16.3% of the total. In all, 16 plantations were affected, but except in two in the Northwestern Region and one in the Central Region, foliar damage was less than 5%. In these three plantations foliar damage ranged from 20% to 45%. Frost damage was recorded on 1,082 trees, or 10% of the total, although in most cases average foliar damage was less than 10%. The only exception was in a plantation in the Northwestern Region where frost-caused foliar damage averaged 63%. Armillaria root rot (*Armillaria mellea* [Vahl ex Fr.] Kummer) was found on five trees and chlorotic foliage was recorded on 11 trees.

WHITE SPRUCE FLOWER CONE AND SEED SURVEY

The FIDS Unit conducted this survey in 1984 as a continuation of a program to assess the impact of certain pests on the seed production of various coniferous species in Ontario. The collection of study material was facilitated by a heavy crop of white spruce flowers and cones.

Collections of flowers were made after pollination but before the flowers became fleshy and turned over as conelets. In all, 3,038 flowers were examined in the laboratory, and of these, 774, or 25.6%, were damaged. The proportion of flowers damaged ranged from a low of 2.5% in Kirkwood Township, Blind River District, to a high of 72.4% in Muldrew Township, Gogama District. The principal agents causing flower damage were the spruce budworm, a spruce bud moth (*Zeiraphera canadensis* Mut. & Free.), the spruce coneworm, and unknown lepidoptera. Many of the unknown lepidoptera may have been spruce budworm, particularly in areas infested by this insect, but in all cases the insect was absent and identification was necessarily on the basis of damage only. The following insects were also found in the survey but caused only minor damage: the blackheaded cutworm (*Acleris variana* [Fern.]), the purple-striped shootworm (*Zeiraphera destitutana* [Walker]), the lesser yellow spruce shootworm (*Z. fortunana* Kft.), two spruce micro moths (*Eucordylea atrupictella* Dietz. and *E. blastovora* McLeod), the orange spruce needle-miner (*Pulicalvaria piceaella* [Kft.]), the obliquebanded leaf roller (*Choristoneura rosaceana* [Harr.]) and the spring spruce needle moth (*Archippus packardianus* Fern.).

The cone and seed survey was carried out in a similar manner. Some 2,795 green, but fully mature white spruce cones from across the province were examined and dissected in the Sault Ste. Marie laboratory. Of these, 1,566 or 55.9% had some form of insect or disease damage. The heaviest losses occurred in the Northwestern, North Central and Northeastern regions, where the proportion of damaged cones averaged 66%, 72% and 65%, respectively. Seed losses within these damaged cones were 56%, 47% and 42%, respectively. The proportion of damaged cones ranged from a low of 12% in West Oxford Township, Aylmer District, to a high of 100% in Arnott Township, Hearst District, and near Camp 15, Terrace Bay District. The main causal agents of seed and cone damage were as follows: spruce cone maggot (*Hylemya anthracina* [Czerny]), unknown lepidoptera, spruce cone rust (*Chrysomyxa pirolata* Wint.), spruce coneworm, the spruce seed moth (*Laspeyresia youngana* [Kft.]), the spruce budworm, the spruce cone axis midge (*Dasineura rachiphaga* Tripp), a cone moth (*Barbara mappana* Free.) and the fir coneworm (*Dioryctria abietivorella* [Grt.]). As in the case of the flower survey, much of the damage by unknown lepidoptera may have been caused by spruce budworm, particularly in areas that are currently infested by this insect. Other insects that were encountered in low numbers but did not cause appreciable damage were: the spruce seed chalcid (*Megastigmus atedius* Wlk.), the redstriped needleworm (*Griselda radicana* Wlsh.), the spruce cone gall midge (*Dasineura canadensis* Felt), the spruce cone moth (*Archippus albertus* McD.) and a spruce micro moth (*Paralobesia piceana* Free.).

SPECIAL SURVEYS IN 1985

Pheromone Studies

In a continuing effort to improve and develop survey methodology, the FIDS pheromone field program will be expanded this year to enable personnel to evaluate and familiarize themselves with the potential and limitations of pheromones as a survey tool. Pheromone trapping programs will be carried out for a number of insects as described below.

Gypsy Moth (*Lymantria dispar* L.)

A cooperative pheromone trapping program has been carried out with Agriculture Canada in northern Ontario parks and campgrounds for several years. In 1984 the program was expanded to include a number of parks from Thunder Bay west to the Manitoba border. Pheromone traps are deployed near park entrances and in campgrounds in an effort to detect populations that may be introduced to these areas through transfer on recreational equipment and vehicles. In 1984 the program produced negative results at all parks except the following: Red Lodge, on Manitoulin Island, Espanola District (1), Fairbank Provincial Park, Sudbury District (1), Nagogamisis Provincial Park, Hearst District (1), and Rainbow Falls Provincial Park, Terrace Bay District (2). (See Fall 1984 Survey Bulletin.) An expanded trapping program will be carried out in these parks in 1985.

In addition to the program described above, an extensive adult pheromone trapping program and burlap trapping program will be carried out in southern Ontario parks with the cooperation of the Parks Branch of the Ontario Ministry of Natural Resources (OMNR). In this case FIDS rangers will deploy pheromone and burlap traps in southern Ontario parks, and parks personnel will monitor the larval traps during the larval feeding period, submitting any suspect larvae to the Sault Ste. Marie laboratory for identification. The pheromone traps are exposed during the full adult flight period and retrieved by FIDS rangers late in the field season. Positive catches are confirmed by laboratory examination. This program, which is in its third year, has proved very useful in monitoring the buildup and spread of populations in southern Ontario.

Oak Leaf Shredder (*Croesia semipurpurana* [Kft.])

Pheromone trapping of this insect has been carried out at a number of locations in the Central, Southwestern and Northeastern regions for several years. The purpose of the experiments is to determine if pheromone trapping can be used as a survey tool to predict oak leaf shredder populations. Results to date indicate that there is a correlation between the number of moths captured and subsequent population

levels and defoliation. However, more work is needed to determine the optimum pheromone strength and the reliability of this method. To this end, oak leaf shredder pheromone trapping will again be carried out in the regions noted above. Various pheromone strengths will be tested and adult moth captures will be compared with subsequent population and defoliation levels.

Black Army Cutworm (*Actebia fennica* [Tausch.]).

This insect has been recognized in recent years as a serious pest of newly established conifer plantations. It is a particular problem in plantations established on recently burned sites where there is a scarcity of other herbaceous plants for the cutworms to feed on. This year FIDS rangers in the Chapleau, Gogama and Hearst areas will place pheromone traps on prescribed burn sites in an effort to predict where infestations will occur in 1986. In this way, management foresters will have advanced warning of possible cutworm problems and a chance to adjust planting schedules accordingly. Two different types of pheromone traps will be tested.

High-value Plantation Surveys

This year, high-value plantation surveys will concentrate on jack pine in northern Ontario and red pine in southern Ontario.

In northern Ontario each ranger will examine six stands, two each in the <2 m, 2-6 m and >6 m height categories. Two visits will be made to each plantation, the first during the period 3-21 June, and the second during the period 29 July to 31 August. This is so that plantations will be examined at times when most major pests are expected to be present.

The southern Ontario red pine survey will be carried out in the same manner, with visits during the same period.

These tree species were last examined in 1982 and results from both surveys will be compared when the present effort is completed.

Cone and Seed Study

In 1985 a cone and seed study will be carried out on jack pine in northern Ontario and red pine in southern Ontario. This is part of a continuing study to assess the prevalence and impact of various pests on the seed resource of various coniferous species in Ontario. As in previous years, each ranger will attempt to collect 100 green but fully mature second-year cones from a minimum of three cone-bearing trees. Wherever possible, collections will be made from seed orchards or seed

production areas so that data obtained may be related to these high-value stands. The cones will then be submitted to the Sault Ste. Marie laboratory for dissection and analysis. A similar study was carried out in 1982 and the results of both surveys will be compared later in the year when all data have been compiled.

Acid Rain National Early Warning System

In 1984 FIDS staff received a new assignment, namely, to establish a survey for the early detection of acid rain damage to Canada's forests. Accordingly, the Ontario FIDS Unit established 13 plots across the province to monitor changes or damage to the forest that might have been caused by acid precipitation. (See Summer 1984 Survey Bulletin.) In 1985, this program will be expanded with the establishment of an additional 12 plots at various locations across the province. Plots will then be present in all the acid deposition zones in the province in stands which include all the major commercial tree species of Ontario. Monitoring work in the plots will include sampling for damage by insects and diseases, sampling for various symptoms of acid rain, measurement of vertical and radial growth and crown structure and density, sampling of ground cover, and analysis of foliage and soil samples.

FOREST INSECTS

Spruce Budworm

The results of 1984 egg-mass surveys were presented in detail in the Fall 1984 Survey Bulletin. Briefly, egg surveys at some 554 locations across the province showed an overall increase in egg densities of 15%.

In northwestern Ontario increases were recorded in all districts except Thunder Bay District. Consequently, increases in both area and intensity are expected throughout most of this part of the province, but particularly in the Kenora, Dryden, Red Lake and Sioux Lookout districts.

In northeastern Ontario increases were recorded in seven districts and decreases in nine districts. On this basis, a resurgence of budworm populations is expected in the Chapleau, Gogama and Sudbury districts, and continued high populations are forecast for the Hearst, Geraldton and Terrace Bay districts. Populations will likely continue to decline in the remainder of this part of the province.

Populations in southern Ontario will continue to decline because of an overall reduction in egg densities of 57%. Small pockets of medium-to-heavy infestation are expected in isolated areas in the Bracebridge, Parry Sound, Algonquin Park, Lindsay, Maple, and Wingham districts.

Preliminary surveys indicate that spruce budworm development, as expected, varies across the province, but in most cases larval development is slightly ahead of normal. As of 22 May 1985, budworm development in the Fort Frances area is the most advanced, with approximately 20% of the larvae in fourth instar and 80% in third instar. Most other areas of the province report larval development in the second and third instar.

OMNR plans to carry out aerial control operations against the spruce budworm in the following areas: Fort Frances District (5,200 ha), Thunder Bay District (16,000 ha), Hearst District (5,000 ha). In all cases the biological insecticide *Bacillus thuringiensis* (B.t.) will be used.

Jack Pine Budworm (*Choristoneura pinus pinus* Free.)

In 1984, populations of this pest reached levels unprecedented in recent years. (See Summer and Fall 1984 Survey Bulletins.) The area of moderate-to-severe defoliation totaled approximately 1,150,000 ha. The largest areas of infestation were in the Northeastern Region where 429,220 ha were infested in the Blind River, Espanola, Sudbury and Sault Ste. Marie districts. Approximately 171,600 ha were infested in the Northern Region, mainly in the Chapleau, Gogama and Kirkland Lake districts, and 25,400 ha suffered moderate-to-severe defoliation in the Parry Sound District of the Algonquin Region. In northwestern Ontario approximately 370,500 ha were infested in the Atikokan and Thunder Bay districts of the North Central Region. In the Northwestern Region 139,300 ha were defoliated in the Red Lake District and some 14,000 ha were attacked in the southern Fort Frances District.

Egg-mass counts were carried out in the fall of 1984 within and adjacent to infested areas, and overall results indicate that, in 1985, populations will probably persist and expand somewhat in all areas mentioned above. If the current infestation of this insect follows the pattern of previous outbreaks, 1985 will probably be the peak year for defoliation, and population declines may begin in 1986. This is because the jack pine budworm, unlike the spruce budworm, has a history of rapid decline following several years of severe defoliation. However, jack pine is somewhat more susceptible to budworm damage, and mortality in the form of top killing and whole tree mortality can be expected after one to two years of severe defoliation. With this in mind, OMNR plans to spray approximately 167,400 ha against this insect. The target stands are located as follows: Chapleau (21,800 ha), Gogama (34,000 ha), Kirkland Lake (13,000 ha), Blind River (41,000 ha), Espanola (53,000 ha), and Sudbury (4,600 ha). As with the spruce budworm, all spraying will be done with the biological insecticide B.t.

Preliminary surveys are sketchy to date, but early reports indicate that jack pine budworm began emerging in high numbers in the Sault Ste. Marie area as of 22 May 1985. Emergence had also begun in the Sudbury area as of that date.

Gypsy Moth

Populations of this insect increased dramatically in 1984 in the Eastern Region, where a total area of 80,624 ha suffered moderate-to-severe defoliation, mainly in the Tweed and Napanee districts.

Early surveys in this part of the province indicate that gypsy moth began hatching in the above areas about 11 May 1985. Because of a prolonged emergence period, it is expected that complete hatch and dispersal of larvae of this species will not occur until approximately 25 May. Early observations indicate that high populations are present in the Eastern Region again this year. OMNR plans to spray approximately 170 ha of high-value stands with *B.t.* in Sharbot Lake, Silver Lake and Frontenac provincial parks.

Bruce Spanworm (*Operophtera bruceata* [Hulst])

Early reports indicate that high populations of this spring defoliator are again present in maple stands on St. Joseph Island, Sault Ste. Marie District.

Black Army Cutworm

Single, heavy infestations of this insect have been reported near Rawhide Lake in Piché Township, Blind River District, and in Hill Township, Chapleau District. These are areas that were burned in 1984 and are currently being planted with nursery stock.

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22 May 1985

ISSN 0705-503X