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ANNUAL REPORTS OF FOREST BIOLOGY RANGERS

MANITOBA AND SASKATCHEWAN, 1956

by

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J. J. Lawrence, J. B. Martin, M. R. Pratt, J. A. Drouin,
B. B. McLeod, A. Machuk, and G. T. Lalor

INTERIM REPORT 1956–1

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

C A N A D A

DEPARTMENT OF AGRICULTURE

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1. SUMMARY OF RANGER ACTIVITIES AND FOREST INSECT AND TREE CONDITIONS IN MANITOBA AND SASKATCHEWAN IN 1956.

by

V. Hildahl

1.1 Introduction

This report outlines the organization of field aspects of the Forest Insect and Disease Survey in Manitoba and Saskatchewan. Insect and tree disease conditions throughout the two provinces are described only briefly since they are given in detail in the individual district reports of the Forest Biology Rangers.

Each of the ten rangers was responsible for collecting insect and tree disease samples, recording and mapping insect infestations and disease outbreaks, and assessing populations and damage caused by major insects and tree diseases.

Additional field accommodation for the ranger assigned to the Meadow Lake District of Saskatchewan and the replacement of two worn-out vehicles for other districts improved working conditions and provided more adequate coverage of the territory. Improved and extended road systems, particularly in the northern areas of the provinces, also added significantly to the increased coverage. Accessible areas were covered mainly by vehicle travel while coverage of the inaccessible areas was attained through aircraft and boat travel. Aircraft for this purpose were provided either by charter or by the Provincial Forest Service in the province concerned.

Surveys of farm shelterbelts and woodlots were continued in the forested areas and the prairie regions of the two provinces. Preliminary studies were also inaugerated in an attempt to establish the degree of mortality of trees in shelterbelts caused by insects and tree diseases.

Insect surveys in 1956 were highlighted by: The increased activity of the spruce budworm in southern and eastern Manitoba and in the Namew Lake region along the Manitoba - Saskatchewan boundary; the continuing severity of attacks by the jack-pine budworm in the Sandilands Forest Reserve; severe defoliation of pine plantations in the Spruce Woods Forest Reserve by the jack-pine budworm; and an increase in tree mortality caused by a root-collar weevil, Hylobius sp. in lodgepole and Scots pine plantations in the Sandilands Forest Reserve.

Tree disease surveys were continued in all districts. Emphasis was placed on surveys of the mistletoes of Jack pine and black spruce, a trunk rot of trembling aspen, Radulum casearium, a parasitic fungus, Wallrothiella arceuthobii of the jack-pine mistletoe, and spruce needle rust, Chrysomyxa sp.

In addition to the above, any other disease specimens from living or dead trees, which constituted a new distribution record were submitted to the Forest Pathology Laboratory, Saskatoon, Saskatchewan for identification.

1.2 Organization

1.2.1 Ranger Assignments.

There were no changes in the ranger assignments in 1956. One ranger was assigned to each of the 10 survey districts in the two provinces as shown in Fig. 1.

The rangers responsible for forest insect and tree disease surveys in the 10 districts of the two provinces are shown in Table 1.

Table 1.

Forest Biology Ranger Assignments
Manitoba and Saskatchewan - 1956

Forest Biology Ranger	Grade	Forest District	District #
L. L. McDowall	F.B.R. 2	Southern District,Man.*	1
A. E. Campbell	F.B.R. 1	Eastern District, Man.	2
K. L. Mortensen	F.B.R. 1	Southern District,Sask.	10
J. J. Lawrence	F.B.R. 2	Western District,Man.*	3
J. B. Martin	F.B.R. 1	Northern District,Man.	4
M. R. Pratt	F.B.R. 1	Hudson Bay District,Sask.	5
J. A. Drouin	F.B.R. 2	Prince Albert District*	6
G. T. Lalor	F.B.R. 1	Meadow Lake District	7
B. B. McLeod	F.B.R. 1	Northern District,Sask.	8
A. Machuk	F.B.R. 1	West-Central District	9

* Regional Supervisory Headquarters.

1.2.2 Field Accommodation.

Further improvements were made in field accommodation for the Forest Biology Ranger staff. The cabin that was purchased at Loon Lake, Saskatchewan in 1955 for the ranger assigned to the Meadow Lake District greatly facilitated working conditions. Additional coverage of the district was attained and at the same time travel was reduced considerably.

For the first time living accommodation, in the form of a house trailer, was provided for the ranger working in the Northern District of Saskatchewan. The trailer was assigned to the district on a temporary basis but since it proved quite satisfactory the arrangement should be continued until such time that it is feasible to establish permanent ranger quarters.

The use of the trailer improved coverage by the ranger and substantially reduced travel costs in the district.

Water, sewer and lighting facilities were installed in The Pas cabin located at the Airport on Clearwater Lake in the Northern District of Manitoba. This cabin is now provided with all essential services but still requires landscaping of the grounds.

1.2.3 Transportation Equipment.

Two worn-out panel trucks were replaced with new sedan deliveries in the fleet in 1956. They were to provide transportation for the rangers assigned to the Southern and Northern districts of Saskatchewan.

Improvements were also made in water transportation facilities. A 13 foot car-top boat was purchased for use in the Northern District of Saskatchewan.

1.3 Review of Field Activities

1.3.1 General Surveys.

General surveys and sampling of forest insects and tree diseases occupied the greater part of the Forest Biology Rangers field time in all districts. Ground surveys to determine distribution and abundance of major pests were made of all accessible areas while the inaccessible forested areas were covered either by boat or aircraft. Chartered flying in some districts was supplemented by air travel provided by the Provincial Forest services.

1.3.2 Spruce Budworm Aerial Surveys.

Aerial surveys to determine the extent and severity of spruce budworm defoliation were intensified in areas of Manitoba and Saskatchewan known to harbour high populations of this species. Of particular interest were the regions east of Lake Winnipeg and near Namew Lake on the Manitoba - Saskatchewan boundary. Included also in the surveys were the main watersheds of eastern Manitoba, which supported fairly large volumes of white spruce and balsam fir. The rapid increase and severity of spruce budworm in the two former areas warrented special attention in 1956.

The budworm-infested areas were divided into blocks, which were flown in strips of 4 and 8 miles apart by following pre-determined flight lines. Flying was carried out at an altitude of 800 to 1000 feet. Regular recordings were made by the observer at 3-minute intervals in the area east of Lake Winnipeg and at one minute intervals in the Namew Lake region. Aerial observations were checked frequently with ground examinations to determine the loss of current and old foliage. Those data were used to prepare detailed infestation maps.

Data recorded included: Airspeed, height above ground level, starting time on flight line, observation number, stand type, redness of current foliage, amount of old damage; and apparent recovery of the trees.

The following broad classifications were used for rating spruce budworm infestations from the air:-

Defoliation of current growth:

Severe - Balsam fir and white spruce distinctly red from the air; current foliage of the two species 70 to 100 per cent destroyed.

Moderate - Balsam fir and white spruce appearing slightly red from the air; current foliage of the two species 30 to 60 per cent destroyed.

Light - No apparent discoloration of current foliage noticeable from the air; current growth less than 30 per cent destroyed.

Old damage to foliage:

Severe - Many long bare tops. Trees mostly grey and many appearing dead.

Moderate - Occasional bare tops. Greyness and thinness of crowns becoming distinct.

Light - Foliage thin, slight greyish appearance of trees. No dead tops.

Apparent recovery of trees:

Moderately good - some new green foliage on periphery of crown but not strong. Tree may show some signs of redness.

Good - Fairly strong growth of new foliage on periphery of crown over some greyness. No redness showing on crown.

1.3.3 Spruce Budworm Egg Surveys.

To predict the extent of spruce budworm infestations in 1957, egg counts were made in infested and adjacent areas that were considered susceptible to attack by this insect. Since no satisfactory method has been developed for egg sampling on white spruce, the survey in eastern and southern Manitoba was restricted to areas within which balsam fir was dominant. The sequential system of sampling developed by Morris* was used for predicting spruce budworm populations next year at the sampling points.

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* Morris R. F. A sequential sampling technique for spruce budworm egg surveys. Can. Jour. Zoology 32:302-313. 1954.

A somewhat different system was employed for sampling the egg population on white spruce in the Namew Lake region where the host tree balsam fir is relatively scarce. Two 18-inch branches were removed from the mid-crowns of five trees at each sampling point. The branches were packed in kraft bags and forwarded to the Winnipeg Laboratory where they were placed in cold storage. They were later critically examined for spruce budworm egg masses. The number of egg masses per 18 inch branch of foliage was calculated and the results compared with similar counts made in previous years. The counts revealed that, on the basis of past records, the infestation will continue in 1957 at approximately the same population level.

1.3.4 Population Counts of the Boxelder Twig Borer.

Surveys during the past two years have indicated that the boxelder twig borer, Proteoteras willingana (Kearf.) is a primary pest of Manitoba maple in farm shelterbelts. Population sampling of this insect was carried out at a number of points in the southern regions of Manitoba and Saskatchewan to determine the severity of attack in 1956.

Sampling Procedure: (1) Five trees representative of the stand were selected for sampling. (2) One sample branch, 36 inches long, was removed from each cardinal point in the lower crown of each tree. (3) The branches were examined and the total number of twigs, or leaf clusters, and the number of twigs infested were recorded. (4) Data from each tree and branch were recorded independently.

Preliminary examination of the data accumulated to date has shown that infestation of twigs ranges from 2 to 46 per cent throughout the region. The most severe infestation was recorded in farm shelterbelts of Manitoba maple in the vicinity of Moose Jaw, Saskatchewan.

1.3.5 Estimates of Tree Mortality and Hylobius Damage in White Spruce Stands in Manitoba and Saskatchewan.

In conjunction with work being conducted by G. L. Warren, field studies were initiated in 1956 by the Survey to determine the wood volume loss of white spruce in typical spruce - aspen forests in relation to the incidence of a spruce weevil, Hylobius sp. Past history does not indicate that white spruce stands in general throughout Manitoba and Saskatchewan have suffered severe infestation of insects leading directly to mortality or loss of increment. However, fairly large volumes of this tree species in isolated areas are dying at an early age while most stands show some mortality of apparently overmature trees. Examinations conducted in these stands indicated that root weevils may be responsible for the entry of wood decaying fungi which cause high mortality through early maturity and wind breakage.

Five study areas were established in each of the Western and Northern districts of Manitoba and the Hudson Bay, Prince Albert and Meadow Lake districts of Saskatchewan. Only typical white spruce - trembling aspen stands were selected.

To obtain information on stand type and condition as well as the occurrence of insects and tree diseases within the stand, the study was divided into two phases. Stand type and condition was ascertained using the "random pairs - random angle" cruise method developed by Dr. G. Cottam (1947) Botany Department, University of Wisconsin, U. S. A. and tested by H. D. Haswell.* Seventy pairs of trees including all species represented were tallied in each area. From the data redorded the number of stems per acre and tree mortality was determined by using the following formula:

$$\frac{43,560}{3.4644 \times \frac{(x)^2}{(2)}} = \text{stems/acre}$$

where x = average distance in feet between pairs.

Insect and disease conditions were determined through critical examinations of the root systems of 10 living and 10 dead white spruce within the periphery of the cruise limits. A damage index was applied to each affected root (down to the smallest root attacked). Damage to the root collar was assessed independently by making an examination of its separate parts. In order to arrive at a comparative assessment of the responsibility of Hylobius damage to the entry of root and butt fungi, roots were rated on the basis of the number of dead roots to the number of diseased roots and this in turn to the number of diseased roots showing Hylobius damage.

For the classification of damage to the roots and root-collars of white spruce by Hylobius the ratings shown in the following table were used:

Table 2.

Classification of Damage to Conifer Roots by Larvae of Hylobius warreni.

Damage Index*	Description
0	No damage
1	A few scars
2	Less than 1/4 of the root girdled or an equivalent amount of surface abrasion
3	1/4 to 1/2 as above
4	1/2 to 3/4 as above
5	3/4 to complete girdling of root or very large masses of damage

* Damage Index developed by G. L. Warren, Forest Biology Laboratory, Winnipeg.

* Haswell, H. D. Technical Report, Sault Ste. Marie. 1952.

1.3.6 Phenological Studies.

A study of phenological events in Manitoba and Saskatchewan was begun in 1956. Fifty-three survey stations were established and a reference station maintained at Red Rock Lake, Manitoba for obtaining the required data. Survey stations were established in stands that contained one or all of the following tree species: white spruce, jack pine, tamarack and trembling aspen. Only trees in open stands or otherwise exposed were chosen for measurements. Trees growing along roadsides were avoided because of the possibility of being damage by 2-4-D spray. For the sake of uniformity western exposures were usually used at the survey stations.

Procedure at Survey Stations:- Five trees of each species represented at the station were marked and one vigorous terminal shoot, usually on a primary branch, on each tree selected for measurements. Shoot length was measured to the nearest millimeter with a ruler. Two measurements were taken during the season; the first during the latter part of June or early part of July when cumulative shoot growth was about 25 per cent and the other when shoot growth was complete (September 1). The total length of the shoot including the initial bud length was included in the measurements.

Procedure at Reference Station:- Measurements were commenced at Red Rock Lake about May 15 and were continued twice-weekly until September. The initial and subsequent measurements included the length of the bud which was deducted from all measurements at the end of the season.

Preliminary analysis of the data suggests that for our purposes the time of initial measurement at the survey stations should be made when growth is between 25 and 75 per cent completed. The majority of the initial measurements in 1956 were taken too late; in some cases terminal growth was almost completed when the first measurement was made. Some consideration should be given to the possibility of using previous terminal growth as an indicator when initial measurements should be taken. This may be accomplished by measuring the terminal growth put on by the tree each year over the last three year period and calculating the average. When current terminal growth is between 25 and 50 per cent of this average the initial measurement should be taken. This method would probably suffice except in years of abnormal terminal growth.

1.3.7 Sequential Sampling of Curled Tips on Tamarack.

Sequential sampling to determine larch sawfly populations was conducted at 47 permanent tamarack plots in nine forest districts. In previous years infestation ratings were based entirely on ocular defoliation estimates which were subject to considerable human error. The application of a sequential sampling method eliminated human error and all infestations received a standard rating regardless of location or observer.

The population sampling was based on the proportion of current tamarack shoots utilized for oviposition by adult sawflies. Infestations were rated in three broad classes of light, moderate and severe as follows: 0 to .08 per cent utilization = light infestation; .12 to .22 per cent

utilization = moderate infestation; and .28 per cent and over = severe infestation.

Procedure:- The sequential system for sampling populations of the larch sawfly was applied to all permanent tamarack plots in Manitoba and Saskatchewan. This system replaced the 20-branch sample used in previous years. Material was examined and data recorded in the field. Methods for carrying out the sequential sampling were as follows:

(1) The sample unit for sequential sampling was 10 current shoots of tamarack.

(2) Working from the outside tip of the branch in, shoots were examined in groups of 10.

(3) For each group of 10 shoots, the cumulative number of curled tips was recorded.

(4) Sampling was continued in groups of 10 until the number of curled shoots fell outside of two "no-decision bands" into one of the three infestation zones (light, moderate or severe) described on a sequential sampling chart.

Light, moderate and severe zones were described on the sampling chart for counts up to 400 shoots. If counts in excess of 400 were encountered the upper and lower limits of the bands were averaged and zones described as follows: light = less than 39 curled shoots; moderate = more than 39 but less than 100; severe = more than 100.

1.4 Review of Insect Species and Tree Diseases

As indicated by the district ranger reports, the major forest insects in Manitoba and Saskatchewan were the spruce budworm, the jack-pine budworm, and the larch sawfly. There was a notable increase in the extent and severity of spruce budworm infestations in Manitoba. Jack pine stands over a large portion of the Sandilands Forest Reserve suffered severe attacks by the jack-pine budworm. Pine plantations in the Spruce Woods Forest Reserve were also severely defoliated by this species. The larch sawfly was again generally found in all tamarack stands examined with slight population increases being evident in the southeastern section of Manitoba.

The yellow-headed spruce sawfly, fall cankerworm, and the boxelder twig borer were the principal pests found on shelterbelts and ornamental plantings throughout the region. The yellow-headed spruce sawfly continued to severely defoliate farm shelterbelts and ornamental plantings of spruce in the Meadow Lake and Makwa River areas of the Meadow Lake District. The fall cankerworm severely defoliated shelterbelts of elm, Manitoba maple and other deciduous trees in the southern portions of the two provinces. Similarly, moderate to severe infestations of the boxelder twig borer on Manitoba maple were recorded in many shelterbelts.

No changes were recorded in the distribution of major tree diseases. The most serious infections of the mistletoe Arceuthobium americanum on jack pine occur in the Sandilands Forest Reserve, through western and northern Manitoba and in the Nisbet and Fort a la Corne Provincial forests of Saskatchewan. The parasitic fungus, Wallrothiella arceuthobii, which attacks the female flowers of jack pine mistletoe and thereby prevents seed maturation, was again present in most infections. Infections of the dwarf mistletoe, Arceuthobium pusillum were confined to the same areas as in 1955.

A spruce needle rust, Chrysomyxa sp., occurred throughout northern Manitoba and Saskatchewan but infections were noticeably lighter this year. The most severe discoloration of black and white spruces was noted in the Prince Albert District.

1.5 Summary of Insect and Tree Disease Collections

Totals of 3127 insect collections and 234 tree disease collections were submitted by Forest Biology Rangers. The number of collections taken from the principal tree species in the various districts of the two provinces is shown in Table 3.

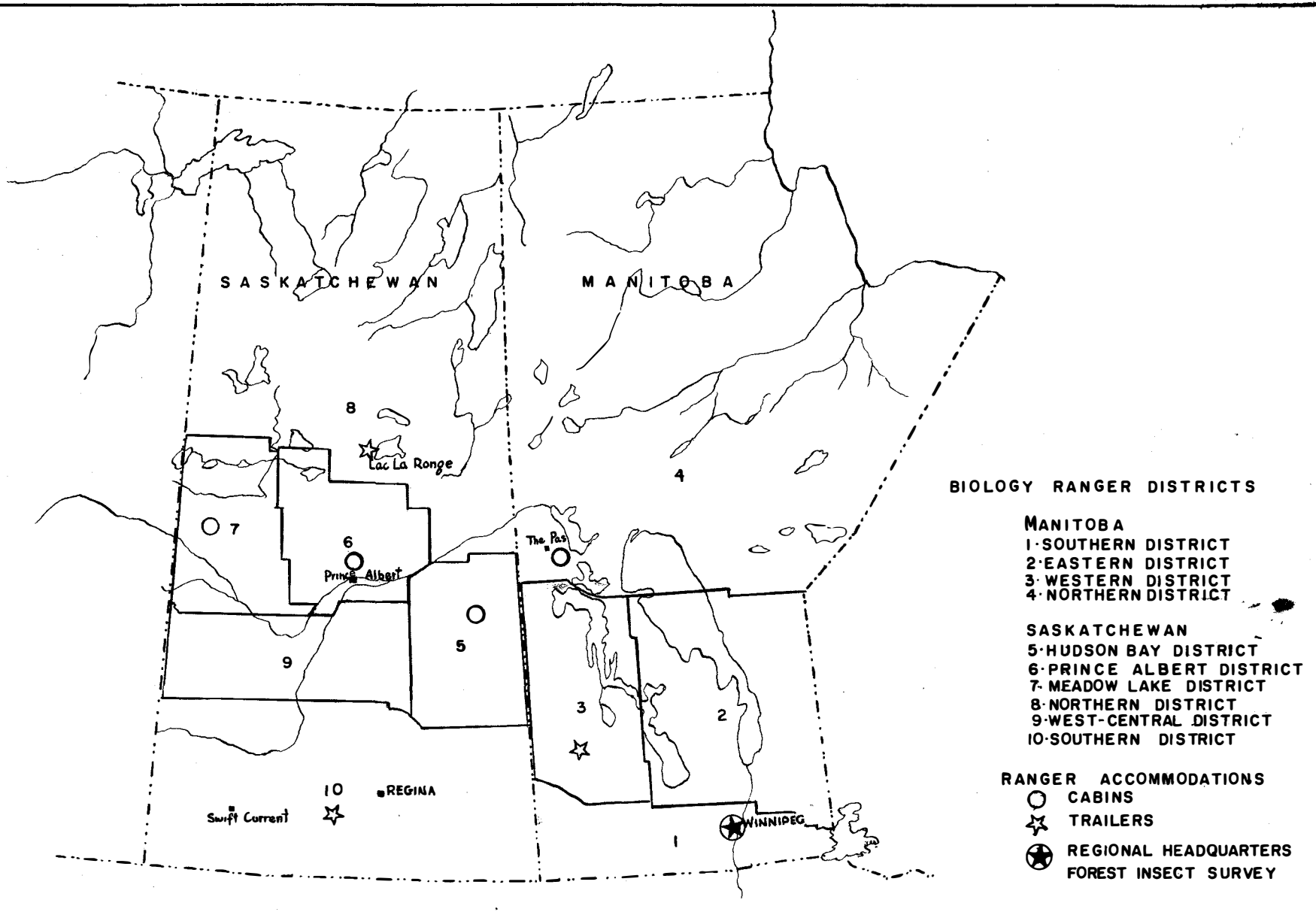
Table 3.
Summary of Insect and Tree Disease Collections from Principal Tree Species by Forest Districts of Manitoba and Saskatchewan - 1956 (submitted by Forest Biology Rangers).

District	Host Tree											Totals	
	White spruce	Black spruce	Balsam fir	Jack pine	Tamarack	Trembling aspen	Balsam poplar	White birch	Manitoba maple	Elm	Misc.	ins.*	dis.*
Southern District Manitoba	36	6	17	72	37	46	12	10	23	9	89	333	24
Eastern District Manitoba	56	12	55	47	59	53	4	0	5	3	48	286	36
Southern District Saskatchewan	53	0	0	17	5	80	5	0	68	4	62	291	3
Western District Manitoba	86	33	7	26	27	62	3	11	1	1	17	257	17
Northern District Manitoba	39	25	11	21	27	45	12	18	4	1	30	219	24
Hudson Bay District Saskatchewan	86	25	7	32	55	116	13	12	0	0	73	393	26
Prince Albert District Saskatchewan	93	100	1	66	30	36	11	3	4	0	49	359	34
Northern District Saskatchewan	74	139	10	76	34	36	11	11	0	0	48	404	35
Meadow Lake District Saskatchewan	156	140	4	7	13	47	6	5	5	0	8	369	22

Table 3 continued

District	Host Tree											Totals	
	White spruce	Black spruce	Balsam fir	Jack pine	Tamarack	Trembling aspen	Balsam poplar	White birch	Manitoba maple	Elm	Misc.	ins.*	dis.*
West-Central District Saskatchewan	43	1	0	9	6	74	10	3	32	6	45	216	13
Total by tree species	702	481	112	373	293	595	87	73	142	24	474	3361	

* ins. = insect collections; dis. = tree disease collections.


SASKATCHEWAN
MANITOBA
8
Lac La Ronge
4
7
6
The Pas
Prince Albert
5
9
3
2
10
REGINA
Swift Current
WINNIPEG
1
BIOLOGY RANGER DISTRICTS
MANITOBA
1-SOUTHERN DISTRICT
2-EASTERN DISTRICT
3-WESTERN DISTRICT
4-NORTHERN DISTRICT
SASKATCHEWAN
5-HUDSON BAY DISTRICT
6-PRINCE ALBERT DISTRICT
7-MEADOW LAKE DISTRICT
8-NORTHERN DISTRICT
9-WEST-CENTRAL DISTRICT
10-SOUTHERN DISTRICT
RANGER ACCOMMODATIONS
CABINS
TRAILERS
REGIONAL HEADQUARTERS
FOREST INSECT SURVEY

2. ANNUAL REPORT OF FOREST BIOLOGY RANGER

SOUTHERN DISTRICT OF MANITOBA

1956

by

L. L. McDowall

INTERIM REPORT - 1956

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

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2.1 INTRODUCTION

Field surveys to determine the distribution and abundance of forest insects and tree diseases were carried out in the forested areas of Southern Manitoba from the latter part of May until the end of October, 1956.

The principal objectives of these surveys were as follows:

(1) detecting and mapping major insect outbreaks;
(2) conducting tree mortality counts in spruce, jack pine, tamarack and aspen stands;
(3) special collections of insects and tree disease material;
(4) sequential population sampling of tamarack for the purpose of determining the severity of larch sawfly infestations;
(5) establishing plots for phenological studies;
(6) contacting government and private co-operators; and
(7) general sampling for minor insects, tree diseases and the abundance of parasites.

A total of 350 insect and 18 tree disease collections were made in 1956. Approximately four hours flying time was provided by the Manitoba Forest Service, which facilitated the mapping of insect outbreaks in the inaccessible areas. The excellent co-operation and assistance received from the Manitoba Forest Service is gratefully acknowledged by the writer.

2.2 REVIEW OF FOREST INSECTS AND TREE DISEASES

Several changes in the status of some major insects occurred in Southern Manitoba in 1956. Populations of the jack-pine budworm showed a notable increase and were causing moderate to heavy defoliation in a number of areas. Spruce budworm maintained its 1955 level in most localities where scattered white spruce and balsam fir are found. However, in the more concentrated stands of balsam fir and spruce in the southeast corner of the Province, defoliation ranged from moderate to heavy.

Populations of the larch sawfly remained much the same as in 1955. However, due to high water levels causing late emergence, the feeding period was prolonged in some parts, causing slightly increased defoliation in these areas.

For the second consecutive year the fall cankerworm caused severe defoliation of maple and elm in the Portage la Prairie area.

Populations of the gray willow-leaf beetle, American poplar beetle, white-pine weevil and a webworm on jack pine remained about the same as in 1955. A slight increase in populations of the yellow-headed spruce sawfly, spiny elm sawfly and the spotless fall webworm was noted throughout the District.

Surveys of trembling aspen, black spruce and jack pine stands to determine the distribution and prevalence of Hypoxylon pruinatum, Arceuthobium pusillum and Arceuthobium americanum have been carried on since 1953. Very little change in the distribution and status of these diseases has been noted during this period.

2.3 INSECT CONDITIONS

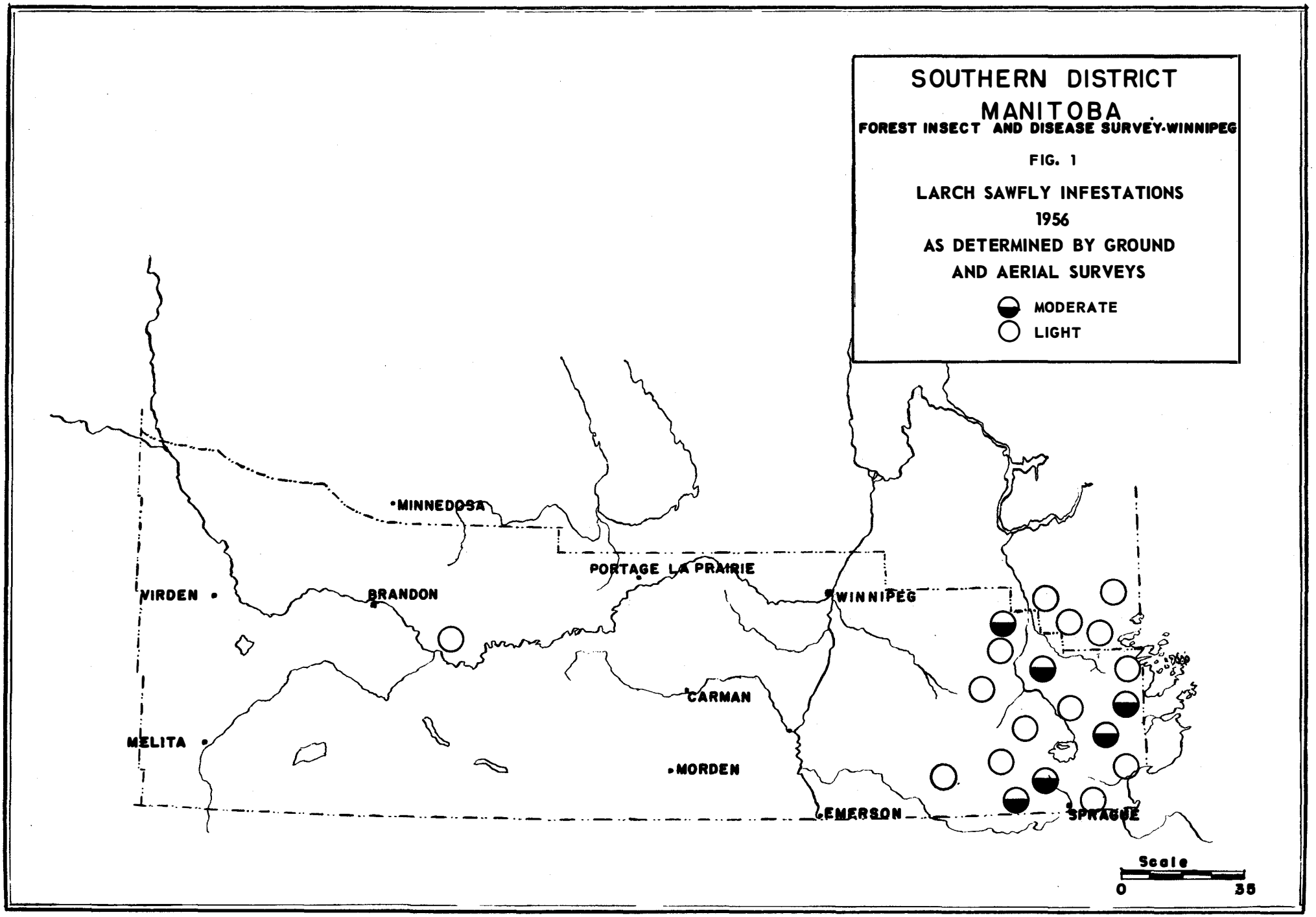
2.3.1 Larch Sawfly, Pristiphora erichsonii (Htg.).

The status of the larch sawfly remained essentially the same as in 1955 throughout most of the Southern District (Fig. 1). Overall defoliation was classed as light to moderate although feeding in several areas showed a slight increase. Adult emergence was approximately two weeks later than in 1955, prolonging the feeding period well into August. The first larch sawfly larvae were collected on June 27 and consisted of first and second instars. A number of adults were present and oviposition was still in progress at this time. Second and third instar larvae were collected as late as August 28, in areas where surface water was present during most of the summer. A number of diseased larvae infected with a fungus, Empusa sp. were collected from several swamps in the Sandilands Forest Reserve.

Defoliation of tamarack from Middlebro east to the United States boundary was generally light, with scattered patches of moderate along the outer edges. West of Middlebro to Sprague and north to Moose Lake, light defoliation was recorded. Generally light defoliation occurred in the region between Sprague and Piney with the exception of two areas. The first, located half mile northwest of South Junction, showed moderate defoliation. Light to moderate defoliation with patches of heavy was recorded in the other stand two miles east of Piney. North of Vassar to Whitemouth Lake, defoliation was light. Tamarack east and west of Menisino showed light to moderate defoliation. From Menisino north to Woodridge, defoliation ranged from nil to light. West of Woodridge to the town of Sandilands, defoliation was spotty and very light. Light to moderate defoliation still prevailed in the area between the town of Marchand and the Sandilands Forest Reserve headquarters. Only an occasional tree in the above-mentioned area was heavily defoliated. In the northern part of the Sandilands Forest Reserve defoliation was generally light with only one swamp showing moderate defoliation. Tamarack in the Hadashville, McMunn, East Braintree and Falcon Lake areas was only lightly defoliated. From East Braintree east to Waugh along the Greater Winnipeg Water District Railway, defoliation was light with patches of moderate scattered throughout. South of Waugh to Harrison Creek, Stony Creek and west to Twin Lakes and Whitemouth Lake, defoliation ranged from light to moderate.

Egg population sampling, using a sequential system, was carried out in four permanent tamarack plots in 1956. This method of sampling appeared to be more efficient and time-saving and the results compared favourably with defoliation estimates taken later in the season.

Two branch samples from the mid-crown of each of five trees were selected. The total number of current curled and uncurled shoots were recorded along with the foliated width and length of each branch. Sampling in groups of ten shoots, the cumulative number of curled shoots were recorded until the number fell outside of either of two no decision bands into one of three zones, classed as light, moderate and severe. In all instances a decision was reached within the ten branch sample. The old method of selecting four branches from each of five trees, collecting and bagging all current curled and uncurled shoots in the field proved to be much more time consuming and less accurate.


SOUTHERN DISTRICT
MANITOBA
FOREST INSECT AND DISEASE SURVEY-WINNIPEG
FIG. 1
LARCH SAWFLY INFESTATIONS
1956
AS DETERMINED BY GROUND
AND AERIAL SURVEYS
MODERATE
LIGHT
MINNEDOSA
PORTAGE LA PRAIRIE
VIRDEN
BRANDON
WINNIPEG
CARMAN
MELITA
MORDEN
EMERSON
SPRAGUE
Scale
0
35

The results of the egg population sampling are shown in Table 1.

TABLE 1

Population Estimates of the Larch Sawfly
(based on sequential sampling of egg populations)

Plot No.	Place	Location				Total shoots examined	No. of curled shoots	Infestation rating
		Sec.	Tp.	Rge.	Mer.			
101	S.F.R.	36	7	10	E.P.	180	12	Light
102	S.F.R.	5	8	10	E.P.	70	2	Light
103	S.F.R.	32	7	11	E.P.	60	1	Light
104	S.F.R.	2	8	11	E.P.	120	18	Moderate

Two mass collections of larch sawfly cocoons were made from permanent plots in southern Manitoba. Collections were made for the purpose of determining by dissection, the distribution and incidence of parasites. The location and number of cocoons in each collection are shown in Table 2.

TABLE 2

Origin of Larch Sawfly Cocoon Collections

Plot No.	Place	Sec.	Tp.	Rge.	Mer.	No. of cocoons collected
103	Sandilands F. R.	32	7	11	E.P.	200
104	Sandilands F. R.	2	8	11	E.P.	200

Results of dissections of the larch sawfly are shown in Table 3. Bessa harveyi (Tnsd.) is still the most prominent parasite in the Southern District although populations remained approximately the same as in 1955. A slight increase in the population of the parasite, Mesoleius tenthredinis has occurred during the past two years.

TABLE 3

Summary of Larch Sawfly Parasitism Determined by Dissections

Place	No. of cocoons examined	No. of larch sawfly larvae containing Mesoleius		Percentage of effective parasitism based on living larvae			Percentage cocoons diseased
		Eggs	Larvae	Bessa harveyi	Mesoleius tenthredinis	Tritneptis klugii	
SFR	100	5	3	19	5	0	14
SFR	100	6	5	18	7	0	18

In 1949 four tamarack plots were established in southeastern Manitoba for the purpose of studying tamarack mortality caused by larch sawfly attacks. The plots ranged from 1/5 acre to 1/4 acre in size and all living and dead trees were tallied. Annual defoliation records were maintained on ten sample trees throughout the infestation period. The plots were retallied in 1956 in order to determine the degree of tree mortality. The per cent losses by basal area, together with defoliation records for the four plots are shown in Table 4.

2.3.2 Spruce Budworm, Choristoneura fumiferana (Clem.).

Aerial and ground surveys conducted throughout southeastern Manitoba showed that distribution and abundance of the spruce budworm has increased to some extent in 1956 (Fig. 2). The first larvae consisting of first and second instars were collected on May 31st from white spruce in the Spruce Woods Forest Reserve.

Although populations have shown a slight increase in the McMunn, East Braintree and Falcon Lake areas, defoliation still remained light with the occasional balsam fir showing moderate defoliation along the outer periphery of the crown. Southeast of Hadashville, along the Dawson Ridge, balsam fir and white spruce suffered light to moderate defoliation. Defoliation was classed as very light throughout the Sandilands Forest Reserve with the exception of one area. Light defoliation with patches of moderate was recorded in this area located north of the headquarters along the west boundary of the reserve. This is a small narrow stand approximately two miles long and is a mixture of balsam fir, spruce, birch and aspen. One collection of this insect, causing light defoliation of a single tamarack tree, was made in the northern part of the Sandilands Forest Reserve.

Populations remained light in the Piney, Vassar and South Junction areas and only slight feeding was observed. In the forested area between Sprague and Moose Lake, population levels remained much the same as in 1955 although a slight increase in defoliation was recorded at several points, particularly in the upper crowns of the trees (Fig. 3). Light to moderate defoliation was recorded in the above-mentioned area with patches of moderate to severe occurring within two miles north of Moose Lake.

An aerial survey carried out on July 24 along the Manitoba-Ontario-Minnesota boundaries indicated that this insect had infiltrated into Manitoba at several points along the boundary. A small patch of light to moderate defoliation was recorded south of Waugh in Tp. 7, Rge. 17, E. P. Mer. opposite Rice Bay. Another small area of light defoliation occurred at the mouth of the Powawassan River in Tp. 6, Rge. 17, E. P. Mer. south of Berry Point.

Three small infestations, grouped closely together, were detected further south along the border. The first at the northwest angle, another on the south side of Harrison Creek, and a third along the north bank of Poplar Creek. All suffered light to moderate defoliation. Severe browning of balsam fir and white spruce was recorded in a large area located in Tp. 3, Rge. 17, E. P. Mer. in the vicinity of Stony Creek. A continuation of this infestation ranged eastward into Minnesota. A small isolated patch of balsam fir in Sec. 30, Tp. 6, Rge. 16, E. P. Mer. was lightly defoliated.

SOUTHERN DISTRICT
MANITOBA

FOREST INSECT AND DISEASE SURVEY-WINNIPEG

FIG. 2

DEFOLIATION OF WHITE SPRUCE AND BALSAM FIR BY THE SPRUCE BUDWORM

1956

- SEVERE
- MODERATE
- LIGHT

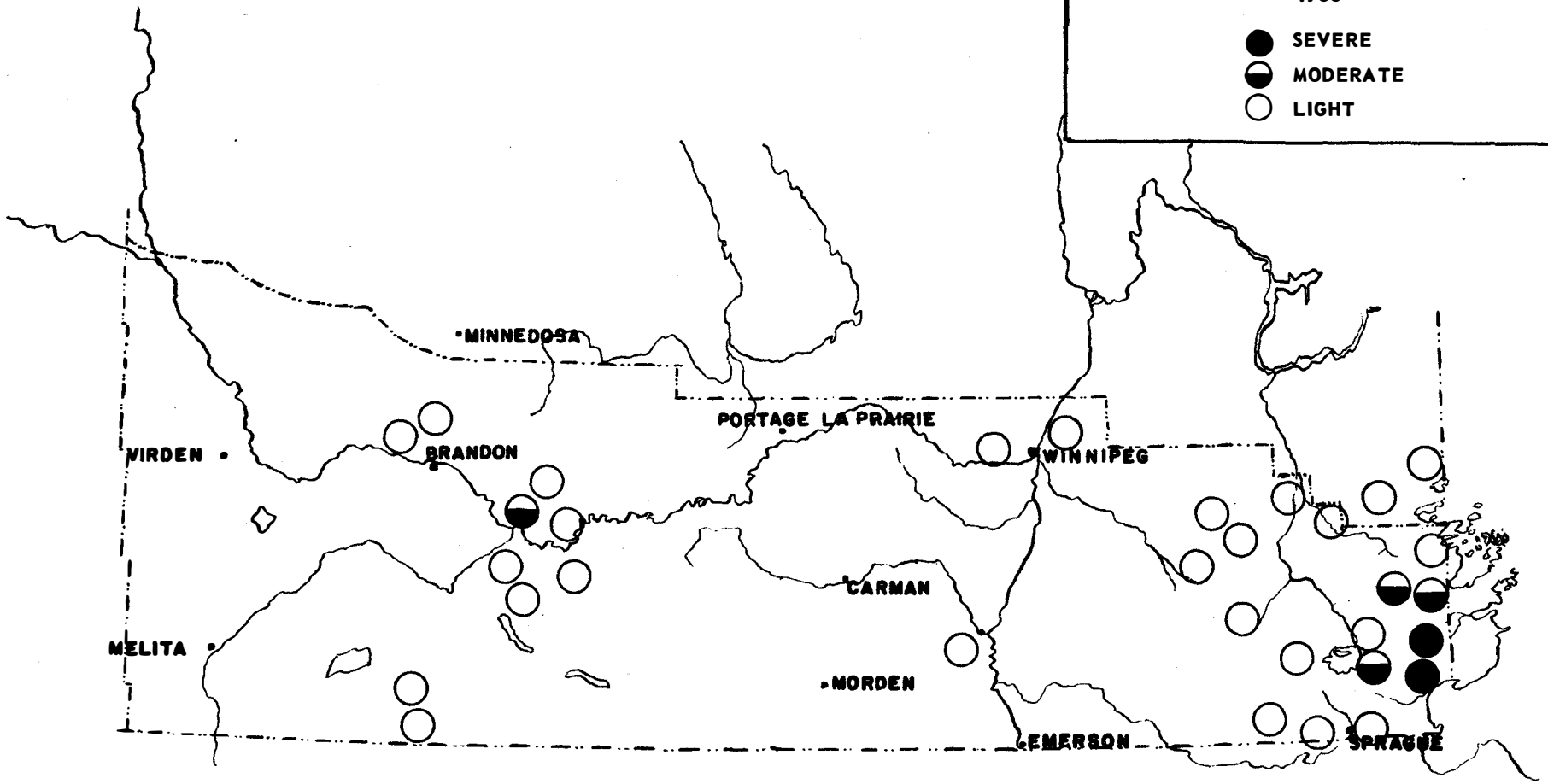


Fig.3

Choristoneura fumiferana Defoliation at Moose Lake, Man.

Photograph by L.L. McDowall.
Negative Number W-467

TABLE 4

Summary of permanent Tamarack Plots in the Southern District of Manitoba
Showing Percentage Dead Trees by Basal Area and History
of Larch Sawfly Defoliation during Period shown by Tally Years
(Percentage of dead trees being the cumulative mortality)

Plot No.	Tally year	Tamarack only d.b.h. Living trees Range	Tamarack only d.b.h. Living trees Average	Tamarack only d.b.h. Dead trees Range	Tamarack only d.b.h. Dead trees Average	Basal area sq.ft. Living	Basal area sq.ft. Dead	Basal area sq.ft. % loss	Total all species Basal area Living	Total all species Basal area Dead	Total all species Basal area % loss	Defoliation history of tamarack Year	Defoliation history of tamarack %	Remarks
101	1949	1"-5"	2.5"	1"-4"	1.22"	12.361	.781	5.84	--	--	--	1949 1950 1951 1952	43.0 17.0 14.5 32.5	Stand reasonably healthy, growth conditions good during past three seasons, water level high in 1956 otherwise normal
	1956	1"-6"	2.3"	1"-3"	1.2"	16.780	1.156	6.44	18.802	1.156	6.15	1953 1954 1955 1956	38.0 24.5 8.6 7.5	
102	1949	1"-9"	4.2"	1"-7"	2.3"	22.575	4.244	15.78	--	--	--	1949 1950 1951 1952	46.0 20.5 23.0 38.0	Moisture adequate majority of trees have numerous dead branches, foliage sparse, some adventitious growth, mixed tL, bS.
	1956	1"-7"	4.1"	1"-6"	2.6"	14.404	4.586	24.14	20.698	4.760	18.70	1953 1954 1955 1956	63.0 12.0 .4 4.0	
103	1949	1"-7"	4.0"	1"-3"	2.0"	4.040	1.066	20.88	--	--	--	1949 1950 1951 1952	76.5 78.5 71.5 57.5	Swamp wet in 1956 otherwise moisture content normal, fair number of dead trees, foliage production fair, mixed tL, bS and C
	1956	1"-8"	4.5"	1"-4"	2.7"	5.373	1.277	19.18	15.920	1.762	9.96	1953 1954 1955 1956	64.5 31.0 13.5 16.0	
104	1949	1"-7"	4.0"	1"-4"	1.6"	13.091	.547	4.01	--	--	--	1949 1950 1951 1952	72.0 15.0 16.5 37.5	Swamp usually wet, foliage spare and confined mainly to top third of tree, mixed stand of bS, C and tL
	1956	1"-8"	4.7"	1"-6"	2.0"	12.625	2.180	14.72	13.696	2.180	16.56	1953 1954 1955 1956	51.5 32.0 12.5 21.5	

Populations of this insect in the Spruce Woods Forest Reserve remained much the same as in 1955. In the Carberry area defoliation ranged from light to moderate. Generally light defoliation occurred in the Camp Shilo area. South of Brandon Junction in the east block of the Spruce Woods Forest Reserve, defoliation was patchy ranging from light to moderate. Light defoliation was general throughout the south block north of Cypress River. Collections of this insect were also made from Brandon, Morden and in the Turtle Mountain Forest Reserve. In all instances defoliation was light.

Intensive egg surveys were carried out in the accessible areas in southeastern Manitoba to determine the distribution and intensity of infestations likely to occur in 1957.

The following table shows current defoliation and the expected intensity of the infestation in 1957.

TABLE 5

A Forecast of the Probably Infestation in 1957
at a Number of Representative Points in Southern Manitoba

Location	Defoliation prior to 1956	Defoliation recorded in 1956	Prediction for 1957
Moose Lake	light	moderate	moderate
Moose Lake Road	"	light-moderate	light
Sandilands F. R.	"	light	light
Falcon Lake	"	light	very light
East Braintree	"	light	very light

2.3.3 Jack-pine Budworm, Choristoneura pinus Free.

Substantial increases in the populations and distribution of this insect were recorded throughout the Southern District in 1956. The most marked change was the general surge of populations in the southwest portion of the Sandilands Forest Reserve and in plantations in the Spruce Woods Forest Reserve. A relatively high percentage of staminate flowers was recorded throughout the district. Overlapping larval stages were common and during the latter part of July second and sixth instar larvae together with pupae and adults were noted. A pupal parasite, Itoplectis conquisitor was present in relatively high numbers in the infested areas in the Sandilands Forest Reserve. A number of mass collections were made from both jack pine and Scots pine.

In the southwest portion of the Sandilands Forest Reserve, where populations had remained fairly static during the past two years have now built up in sufficient numbers to cause moderate to severe defoliation. Defoliation was severe enough that browning of the foliage was common and it is reasonable to assume that some mortality may occur among the younger trees.

The heaviest defoliation in this area, located in Secs. 31, 32, 4, 5, 6, 7 and 8; Tps. 1 and 2, Rge. 11, E. P. Mer., occurred on the more open growing trees. A survey carried out in the northern part of the Sandilands Forest Reserve revealed that the fire in September, 1955, which burned out heavily defoliated areas, did not appear to seriously reduce populations in remaining stands. Unburned timber in the adjacent area still harboured relatively high populations and defoliation ranged from moderate to severe. Another area of moderate to severe defoliation was recorded north of Badger in the Sandilands Forest Reserve. Elsewhere throughout the Reserve defoliation was generally light.

Jack pine stands southeast of Hadashville along the Dawson Ridge suffered moderate to severe defoliation. A number of dead tops were noted in this area. They are attributed to previous attacks by the jack-pine budworm. Scattered collections of this insect were made in the East Braintree-Falcon Lake area but in all instances defoliation was light.

The accompanying map (Fig. 4) indicates the distribution and abundance of the jack-pine budworm in southeastern Manitoba.

A notable increase in populations of the jack-pine budworm was recorded in the Spruce Woods Forest Reserve in 1956. A number of jack pine, lodgepole pine and Scots pine plantations in the Camp Shilo and Carberry areas suffered moderate to severe defoliation (Figs. 5 & 6).

In lodgepole and Scots pine plantations much of the old foliage was killed by severe "winter drying". This condition was most severe on lodgepole pine plantings from 23 to 30 years of age. The affected trees produced new foliage in the summer of 1956 but this in turn was severely attacked by the jack-pine budworm. The extent of budworm attack appeared to be associated with the abundance of staminate flowers.

In mid-August a survey was made of all pine plantations in the Reserve. The purpose of this survey was to determine the extent of damage due to winter drying, severity of budworm attack and to obtain a record on the abundance of staminate flowers in the infested plantations (Figs. 8a & 8b).

The results of the survey are summarized in Table 6.

TABLE 6

Plantation Survey
Jack-pine Budworm Defoliation and Winter Drying Survey
Spruce Woods Forest Reserve - 1956

Plot Ref. No.	Plantation No.	Tree species	Flowering record	Range of current budworm defol.	Degree of winter drying
1	10-30	Jack pine	moderate	light	nil
2	9-30	Jack pine	moderate	light	nil
3	11-30	Lodgepole pine	light	light	light
4	99-26	Scots pine	nil	nil	nil
5	98-25	Scots pine	nil	nil	nil

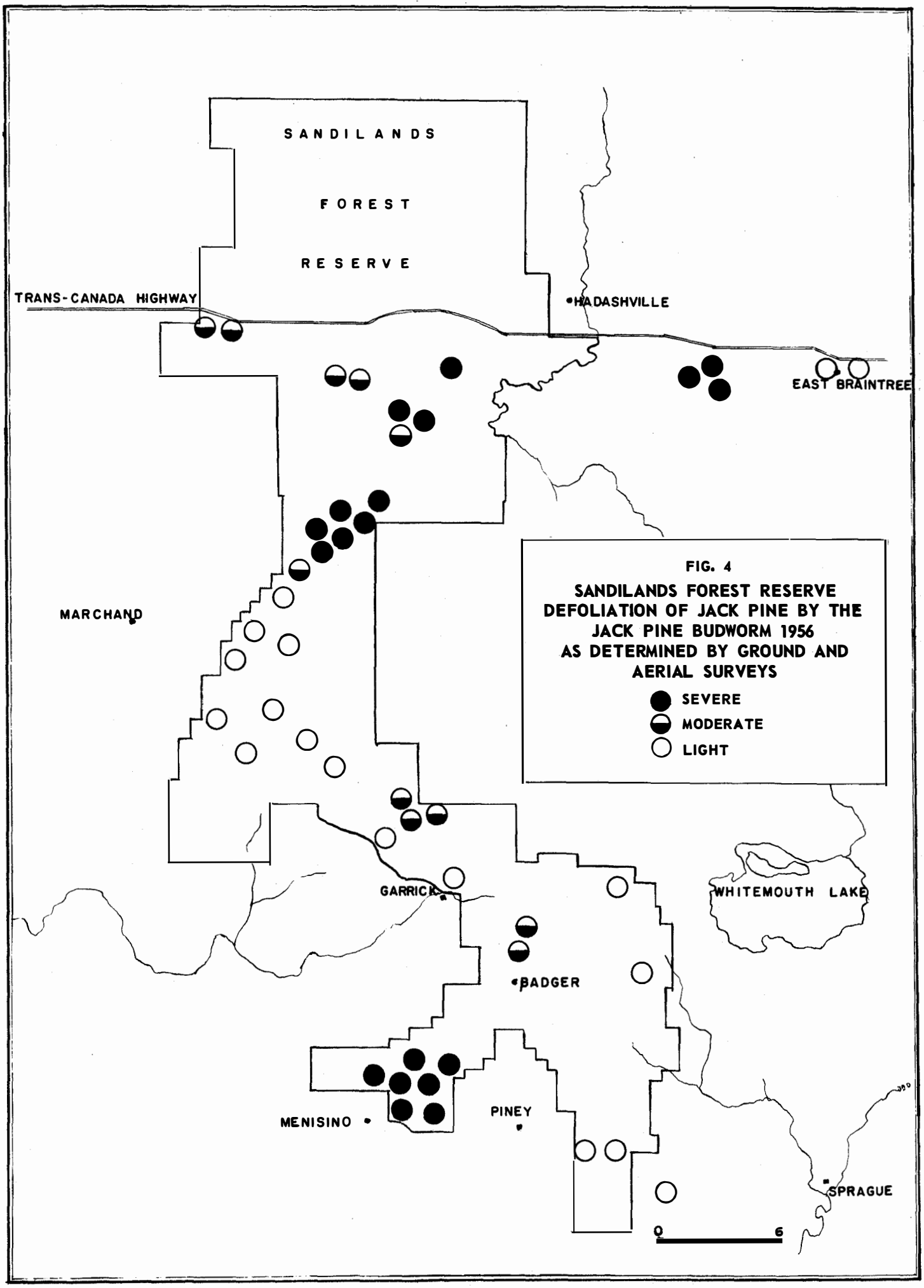

SANDILANDS
FOREST
RESERVE
TRANS-CANADA HIGHWAY
HADASHVILLE
EAST BRAINTREE
MARCHAND
GARRICK
WHITEMOUTH LAKE
BADGER
MENISINO
PINEY
SPRAGUE
0
6
FIG. 4
SANDILANDS FOREST RESERVE
DEFOLIATION OF JACK PINE BY THE
JACK PINE BUDWORM 1956
AS DETERMINED BY GROUND AND
AERIAL SURVEYS
SEVERE
MODERATE
LIGHT

Fig.5

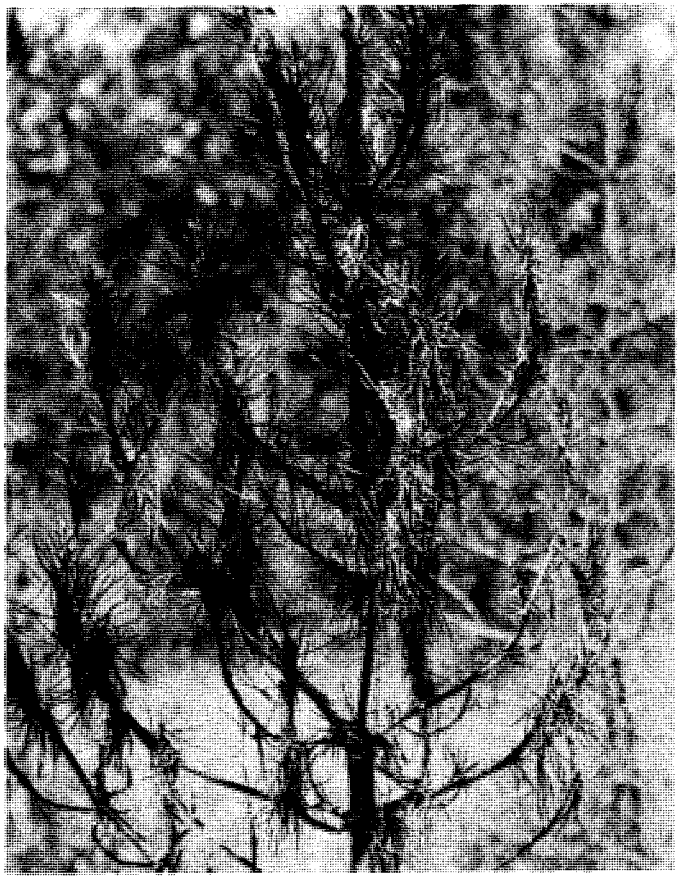
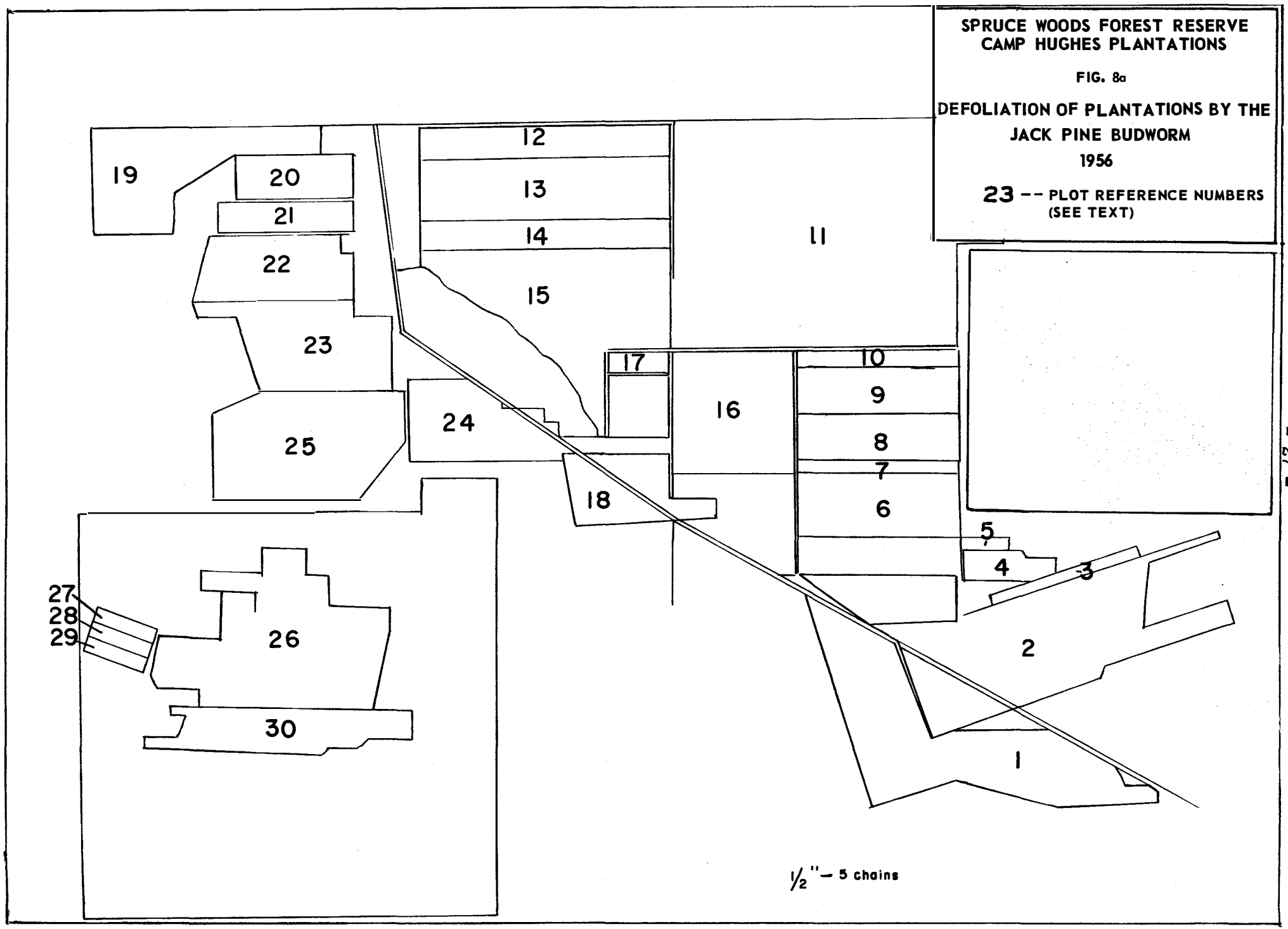


Fig.6

Figs.5 and 6. Defoliation of Jack Pine and Lodgepole Pine by Choristoneura pinus. Spruce Woods Forest Reserve, Man.
Photographs by L.L. McDowall.
Negative Numbers W-466
W-465

Table 6 (continued)

Plot Ref. No.	Plantation No.	Tree species	Flowering record	Range of current budworm defol.	Degree of winter drying
6	87-25	Scots pine	light	light	nil
7	86-25	Scots pine	moderate	moderate	light
8	85-25	Jack pine	light	light	nil
9	84-25	Scots pine	L - M	mod.-heavy	light
10	83-25	Scots pine	moderate	heavy	light
11	8-30	Scots pine	moderate	heavy	nil
12	3-30	Jack pine	light	light	nil
13	4-30	Scots pine	L - M	moderate	nil
14	5-30	Lodgepole pine	light	mod.-heavy	nil
15	6-30	Jack pine	light	moderate	nil
16	81-25	Scots pine	light	light-mod.	light
17	82-25	Lodgepole pine	light	light	heavy
18	7-30	Jack pine	moderate	light	nil
19	1-30	Jack pine	moderate	light-mod.	nil
20	2-05	Scots pine	moderate	light	nil
21	79-25	Scots pine	light	light	nil
22	3-06	Scots pine	light	light	nil
23	4-07	Scots pine	L - M	light	nil
24	80-25	Scots pine	light	light	light
25	2-30	Jack pine	light	nil	nil
26	2-27	Scots pine	light	L - M	nil
27	56-24	Jack pine	moderate	light	nil
28	57-24	Jack pine	light	light	nil
29	58-24	Jack pine	light	light	nil
30	40-22	Lodgepole pine	light	light	heavy
31	1-32	Lodgepole pine	light	light	light
32	2-32	Scots pine	L - M	L - M	nil
33	3-32	Scots pine	light	light	nil
34	14-17	Jack pine	light	light	nil
35	26-20	Scots pine	M - H	M - H	nil
36	8-39	Jack pine	light	nil	nil
37	5-44	Lodgepole pine	light	light	light
38	3-33	Lodgepole pine	light	light	M - H
39	4-33	Lodgepole pine	light	moderate	heavy
40	5-33	Jack pine	light	very light	nil
41	6-33	Jack pine	light	nil	nil
42	7-33	Jack pine	light	nil	nil
43	20-18	Jack pine	L - M	L - M	nil
44	13-33	Jack pine	very light	nil	nil
45	22-18	Jack pine	light	light	nil
46	21-18	Jack pine	moderate	mod.-heavy	nil
47	19-18	Jack pine	moderate	light-mod.	nil
48	16-17	Jack pine	light	light	nil
49	17-17	Jack pine	light	very light	nil
50	6-32	Jack pine	light	nil	nil


SPRUCE WOODS FOREST RESERVE
CAMP HUGHES PLANTATIONS
FIG. 8a
DEFOLIATION OF PLANTATIONS BY THE
JACK PINE BUDWORM
1956
23 -- PLOT REFERENCE NUMBERS
(SEE TEXT)
19
20
21
22
23
25
12
13
14
15
11
17
16
24
18
10
9
8
7
6
5
4
3
2
1
27
28
29
26
30
1/2" — 5 chains

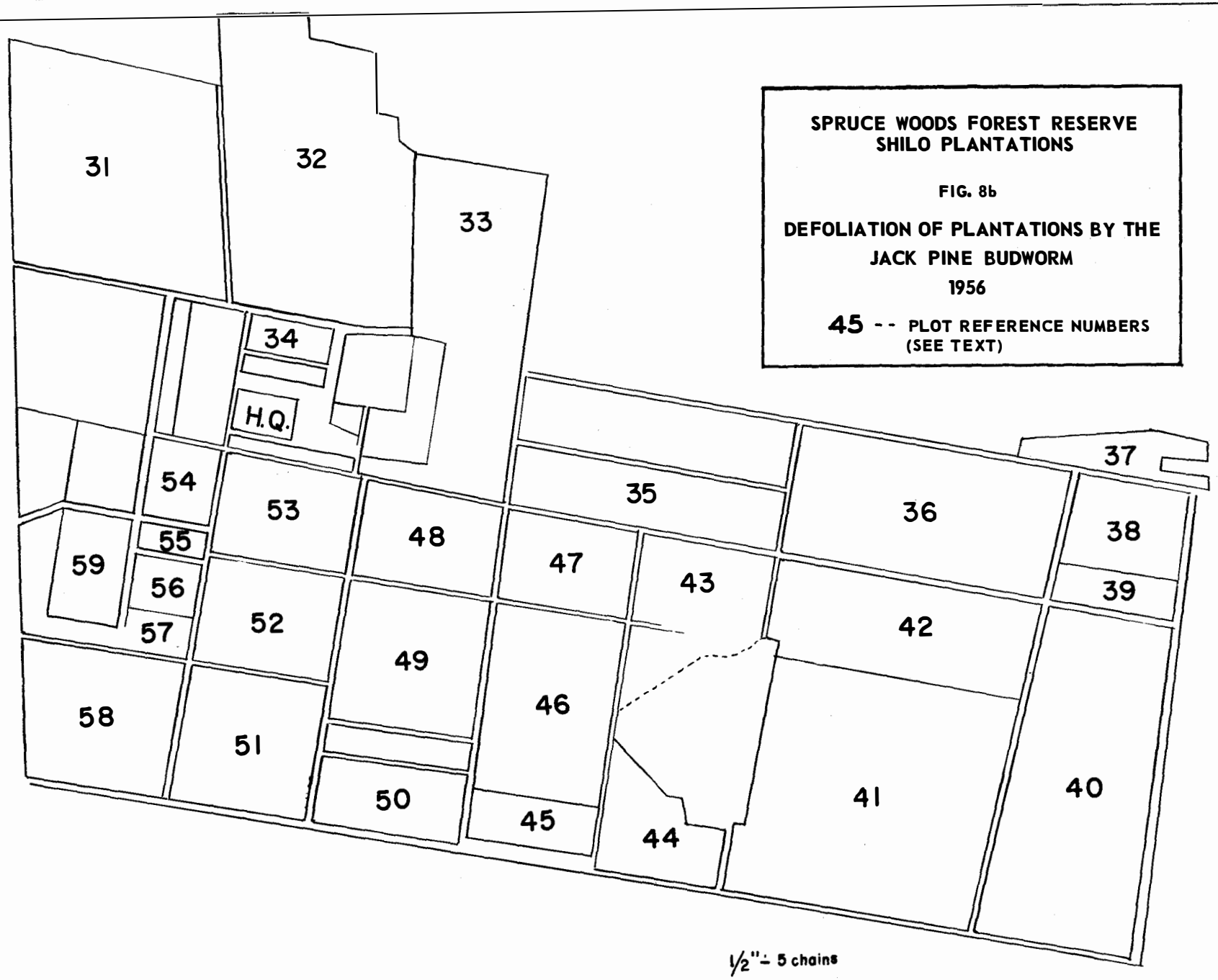

SPRUCE WOODS FOREST RESERVE
SHILO PLANTATIONS
FIG. 8b
DEFOLIATION OF PLANTATIONS BY THE JACK PINE BUDWORM
1956
45 -- PLOT REFERENCE NUMBERS (SEE TEXT)
31
32
33
34
H.Q.
54
53
48
35
36
37
38
59
55
56
57
52
49
47
43
42
39
58
51
46
50
45
44
41
40
1/2" = 5 chains

Table 6 (continued)

Plot Ref. No.	Plantation No.	Tree species	Flowering record	Range of current budworm defol.	Degree of winter drying
51	23-18	Jack pine	L - M	light	nil
52	12-16	Scots pine	L - M	L - M	nil
53	8-16	Scots pine	L - M	L - H	nil
54	7-16	Jack pine	L - M	L - M	nil
55	10-16	Jack pine	M - H	M - H	nil
56	11-16	Lodgepole pine	moderate	M - H	nil
57	2-33	Lodgepole pine	light	M - H	heavy
58	1-33	Lodgepole pine	L - M	L - M	nil
59	9-16	Lodgepole pine	moderate	moderate	L - M

Lodgepole pine plantations suffered the heaviest damage due to "winter drying", and up to 60 per cent tree mortality was recorded in some plantations as a result of "winter drying" and heavy budworm defoliation.

Scots pine plantations, ranging in age from 16 to 35 years, with moderate to heavy staminate flower production, appeared to be more susceptible to budworm attack. Scots pine plantations in the 50 year-old class showed very little defoliation and little or no "winter drying". Bark beetles and wood borers were present in several lodgepole pine plantations.

Heavy deer grazing occurred in a number of jack pine plantations throughout the Spruce Woods Forest Reserve in 1956 (Fig. 7). This grazing took place for the most part in the lower crowns and, except for the unsightly appearance of the trees, no serious damage could be attributed to this condition at the present time.

2.3.4 Fall Cankerworm, Alsophila pometaria (Harr.).

For the second consecutive year, significant increases in population levels of this species occurred in the Portage la Prairie district. The main outbreak, as in 1955, appeared to be centered in and around Island Park. Manitoba maple and American elm in the above-mentioned area suffered moderate to severe defoliation (Fig. 9). A marked change in this years infestation was the fact that besides completely denuding Manitoba maple and elm, oak and basswood, the undergrowth such as dogwood, chokecherry, etc. were also subjected to a considerable amount of feeding by this insect. Defoliation ranged from moderate to severe along boulevards and around private residences throughout Portage la Prairie. A large Manitoba maple shelterbelt, three miles south of MacDonald was completely stripped (Fig. 10). One hundred per cent defoliation was also recorded on another shelterbelt one mile north of Elie. Light defoliation with patches of moderate occurred on scattered elm and maple eight miles west of Portage. Defoliation ranged from light to moderate in the

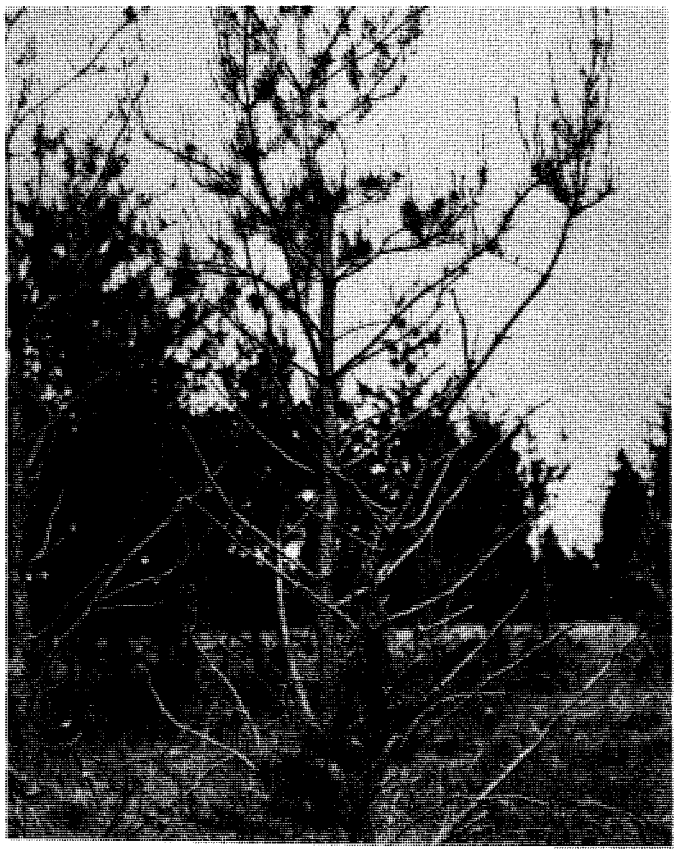


Fig.7

A Jack Pine Plantation Heavily Grazed by Deer in the Spruce Woods Forest Reserve, Man. Photograph by W.A. Reeks. Negative Number W-495

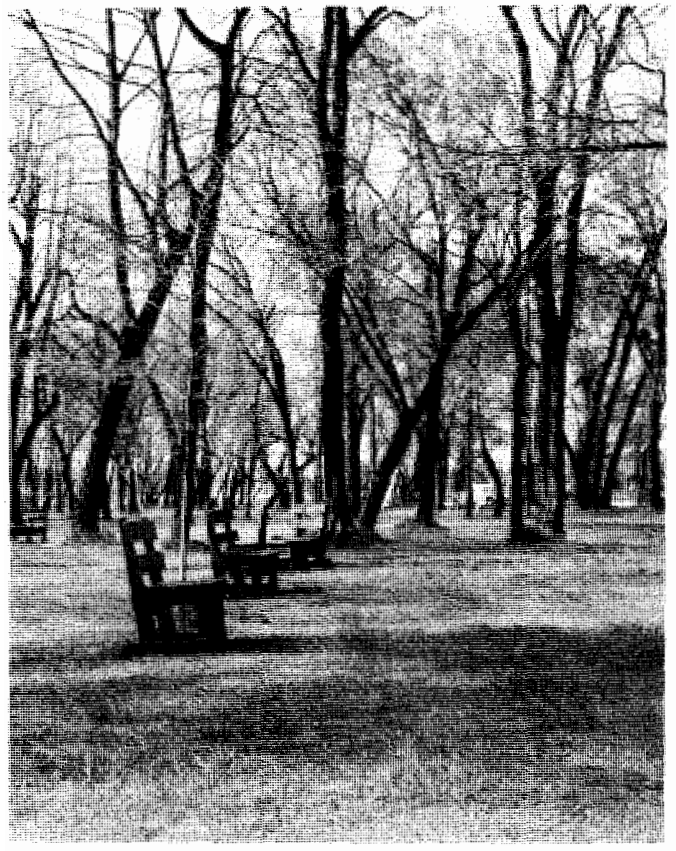


Fig.9

Severe Defoliation of Manitoba Maple by Alsophila pometaria. Portage La Prairie, Man.
Photograph by L.L. McDowall.
Negative Number W-491

Fig.10

Severe Defoliation of Manitoba Maple by Alsophila pometaria. Macdonald, Man. Photograph by L.L. McDowall.
Negative Number W-492

southern portion of the city of Brandon. Other points where light to moderate defoliation occurred are as follows: MacGregor, Austin, Holland, Wawanesa and Newton.

Experimental larval population sampling was carried out in the Portage la Prairie district during the second week of June when the majority of the larvae were in the fourth and fifth instars. Three sampling stations were established in areas having what appeared to be different classes of infestations.

At the first station four trees were sampled as follows: Four leaf clusters were taken from each of four cardinal points in the three crown levels. On the other tree one cluster was selected from each of four cardinal points in the lower crown. The latter scheme was used at the two remaining stations.

Following the completion of the larval feeding period the sample stations were checked for defoliation estimates on the fifteen trees. Estimates were made in the three broad classes of light, moderate and severe. The data obtained and subsequent defoliation estimates are shown in the following table.

TABLE 7

Results of Branch Sampling to Determine Populations of the Fall Cankerworm

Sampling Area - 1

Tree No.	Crown level	No. of leaves per 16 clusters	Ave. No. of leaves per cluster	No. of larva per 16 clusters	Ave. No. of larva per cluster	Defoliation
1	Upper	232	14.5	55	3.4	
	Middle	204	12.7	62	3.9	Severe
	Lower	170	10.6	57	3.5	
2	Upper	249	15.5	67	4.2	
	Middle	219	13.6	57	3.5	Severe
	Lower	239	14.9	64	4.0	
3	Upper	219	13.6	64	4.0	
	Middle	201	12.5	59	3.7	Severe
	Lower	213	13.3	56	3.5	
4	Upper	231	14.4	61	3.8	
	Middle	237	14.8	64	4.0	Severe
	Lower	210	13.1	54	3.3	
5	Lower	234	14.6	45	2.8	Moderate

Table 7 (continued) Sampling Area - 2

Tree No.	Crown level	No. of leaves per 16 clusters	Ave. No. of leaves per cluster	No. of larva per 16 clusters	Ave. No. of larva per cluster	Defoliation
6	Lower	201	12.5	21	1.3	Moderate
7	Lower	187	11.6	34	2.1	Moderate
8	Lower	217	13.5	28	1.7	Moderate
9	Lower	177	11.0	23	1.4	Moderate
10	Lower	168	10.5	54	3.4	Moderate
			Sampling Area - 3			
11	Lower	237	14.8	8	.50	Light
12	Lower	231	14.4	6	.37	Light
13	Lower	222	13.8	4	.25	Light
14	Lower	249	15.5	3	.18	Light
15	Lower	255	15.9	6	.37	Light

The average number of larvae per infested leaf cluster in the heavy defoliation class was 3.7; in the moderate 2.1; and in the light .33.

2.3.5 Boxelder Twig Borer, Proteoteras willingana Kft.

An extensive survey for the distribution and abundance of this insect was conducted in Manitoba maple stands throughout southwestern Manitoba in 1956. It was found to be present in the majority of areas examined and a sampling technique was devised in an effort to determine the percentage of twigs infested. Seven sampling points spaced widely apart were chosen as study areas. The sampling method used was as follows: One branch was taken from each cardinal point in the lower crown from each of five trees in the seven areas. Cardinal direction, total number of twig clusters on each branch, and number of twig clusters infested were recorded. Results of the survey and location of the sampling stations are shown in the following table.

TABLE 8

Results of Special Sampling of Boxelder Twig Borer Populations
Southwestern Manitoba - 1956

Place	Sec.	Tp.	Rge.	Mer.	Total No. of twig clusters	Total No. of twigs infested	Percentage twigs infested
Camp Hughes	35	10	16	W.P.	242	23	9.5
Souris	3	8	22	"	248	29	11.7
Deloraine	4	3	23	"	218	14	6.9
Ninette	13	5	17	"	215	24	11.2
Holland	29	7	11	"	253	33	13.0
Portage la Prairie	35	11	7	"	274	45	16.4
Turtle Mnt. F.R.	3	1	20	"	263	61	23.1

Although this insect was found in all areas examined, it will be noted that the percentage of infested twigs was relatively small in comparison with the total number of twig clusters.

2.3.6 Pine Root-collar Weevil, Hylobius sp.

This destructive species was still by far the most important insect found attacking Scots and lodgepole pine plantations in the Sandilands Forest Reserve. Although this weevil did not appear to have spread outside of the plantations infested in 1955, the mortality rate within these plantations had increased to some extent. Mortality surveys were again conducted in all pine plantations in the Sandilands Forest Reserve in 1956. Random counts of 100 trees per plantation were carried out. The results of this survey are shown in Table 9.

TABLE 9

Percentage Mortality Caused by a Root-Collar Weevil, Hylobius sp.

Plot No.	Year planted	No. of acres	Tree species	Per cent Mortality by Stems		
				scP	rP	lP
1	1939	15.0	scP	35	--	--
1	1938	--	rP	--	0	--
1	1940	3.4	lP,scP	32.0	--	13.0
1	1941	.6	lP	--	--	46.0
1	1941	22.1	scP	15.0	--	--
1	1941	--	scP	12.0	--	--
1	1942	10.9	lP,scP	15.0	--	8.0
2	1940	10.7	lP,scP,rP	7.0	--	10.0
2	1943	2.5	lP	--	--	6.0
1	1942	--	rP	--	0	--
2	1946	15.9	scP	16.0	--	--
2	1947	6.9	scP	27.0	--	--
3	1947	36.5	scP	5.0	--	--
1	1947	11.2	scP	4.0	--	--
3	1937	6.7	rP	--	0	--

Surveys showed that an increase in mortality occurred in the majority of plantations and overall mortality ranged from 4 to 46 per cent, an increase of about 12 per cent over 1955. Extensive surveys conducted in pine plantations of the Spruce Woods Forest Reserve failed to reveal the presence of this insect. It was also noted that red pine and jack pine plantations were still relatively free from attack.

2.3.7 White-pine Weevil, Pissodes strobi (Peck.).

Damage caused by this insect remained essentially the same as in 1955 in the southeastern portion of Manitoba. Light to moderate damage to the leaders of jack pine reproduction was recorded in the vicinity of South Junction and in scattered jack pine between Woodridge and Sandilands in the

Sandilands Forest Reserve. Several scattered collections were made elsewhere throughout the southeastern district but in all instances damage was light. A number of collections were taken from white spruce in the Spruce Woods Forest Reserve but damage was light and widely scattered. A new outbreak of light intensity among Scots pine plantations was recorded north of No. 1 highway seven miles west of Carberry.

2.3.8 Gray Willow-leaf Beetle, Galerucella decora (Say).

Light skeletonizing of willow foliage was general throughout most of Southern Manitoba in 1956. Only one area of heavy defoliation was recorded and that was to a small patch of willow in the northeast corner of the Sandilands Forest Reserve.

2.3.9 Oak Ugly-nest Tortrix, Archips fervidana Clem.

Only two collections of this insect were made in Southern Manitoba in 1956. At one point two miles east of Richer populations were relatively high and a count carried out in this area revealed that six out of ten oak trees contained one or more nests. Very few nests were noted at the other collection point two miles north of Elie.

2.3.10 American Poplar Beetle, Gonioctena americana (Schaeff.).

Low populations of this insect occurred in all parts of Southern Manitoba where collections were made in 1956. Light defoliation was recorded at the following points: Turtle Mountain Forest Reserve, Boissevain, Ninette, Spruce Woods Forest Reserve, Sandilands Forest Reserve and in the East Braintree Falcon Lake area. In all instances the host was trembling aspen.

2.3.11 Ugly-nest Caterpillar, Archips cerasivorana (Fitch).

The distribution of this species was widespread throughout southern Manitoba. Although defoliation for the most part ranged from light to moderate, nests appeared more numerous in several areas than in 1955. Defoliation ranged from moderate to heavy in the west block of the Spruce Woods Forest Reserve and in the north central portion of the Sandilands Forest Reserve. Several chokecherry bushes in the latter area, ranging up to 6 feet in height, were completely enveloped by webbing. Other areas of light to moderate defoliation occurred at Boissevain, Ninette, Wawanesa and parts of the Turtle Mountain Forest Reserve.

2.3.12 Eastern Tent Caterpillar, Malacosoma americanum (F.).

Collections of this insect were made from two areas in the Southern District during June of 1956. The first area, located in the extreme southwest corner of the Sandilands Forest Reserve, harboured relatively high populations and defoliation ranged from moderate to heavy on both chokecherry and pincherry. Moderate to heavy defoliation also occurred in this area in 1955. This species was collected for the first time in the Spruce Woods Forest Reserve. However, defoliation was light and all larvae collected were taken from chokecherry.

2.3.13 A Tent Caterpillar, Malacosoma lutescens (N. & D.).

A further decline in the abundance of this caterpillar was evident throughout southern Manitoba in 1956. Collections were widely scattered and populations light.

2.3.14 Forest Tent Caterpillar, Malacosoma disstria Hbn.

Only one larva of this insect was collected in southern Manitoba. It was taken from trembling aspen in the vicinity of Sprague.

2.3.15 Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.).

A slight increase in populations of this sawfly was recorded in the eastern part of the District, the area in question being more or less confined to the northeast corner. Collections were taken from white spruce at the following points: Whitemouth, Elma, Hadashville, Pravda, McMunn, East Braintree, Falcon Lake and West Hawk Lake. Defoliation at all points was generally light with the exception of one small planted stand in the vicinity of McMunn where defoliation ranged from moderate to heavy on several trees.

2.3.16 Green-headed Spruce Sawfly, Pikonema dimmockii (Cress.).

One small collection of this insect was made in the East Braintree area but no defoliation was evident.

2.3.17 Balsam-fir Sawfly, Neodiprion abietis (Harr.).

This sawfly was collected from only two areas in Southern Manitoba in 1956. In the Turtle Mountain Forest Reserve, populations were light and little or no defoliation occurred. A large white spruce shelter bordering No. 1 highway on the outskirts of Brandon suffered moderate to heavy defoliation.

2.3.18 Elm Sawfly, Cimbex americana (Leach).

Two collections of this insect were made, one from willow and another from birch, in the Sandilands Forest Reserve.

2.3.19 Red-headed Jack-pine Sawfly, Neodiprion virgineana Roh.

One small collection of this species was taken from jack pine in the vicinity of Falcon Lake.

2.3.20 Red-pine Sawfly, Neodiprion nanulus nanulus Schedl.

One collection of this species containing five larvae was made from jack pine in the East Braintree area.

2.3.21 Black-headed Budworm, Acleris variana (Fern.).

No heavy populations of this insect were encountered in spruce stands in southern Manitoba. Small numbers of larvae were collected from the Turtle Mountain and Spruce Woods Forest reserves.

2.3.22 Balsam Gall Midge, Itonida balsamicola (Lint.).

A slight increase in the distribution and abundance of this insect was observed in 1956. However, in all instances no serious damage was recorded. Collections were taken from balsam at the following points: Moose Lake, Sprague, Sandilands Forest Reserve and in the East Braintree - Falcon Lake areas.

2.3.23 Webworm on Poplar, Tetralopha asperatella Clem.

A substantial increase in populations of this species was recorded in parts of southwestern Manitoba in 1956. The most conspicuous damage was observed in the Holland, Austin, Carberry and Douglas areas encompassing the Spruce Woods Forest Reserve. Trembling aspen was the preferred host although on occasion several small collections were taken from oak. Damage was classed as light with patches of moderate occurring in the Spruce Woods Forest Reserve and along highway No. 34 between Austin and Holland.

The heaviest damage caused by this insect was recorded in the west block of the Spruce Woods Forest Reserve, where mature and regeneration trembling aspen were subjected to moderate attack.

2.3.24 Spiny Elm Caterpillar, Nymphalis antiopa L.

A more widespread distribution together with increased populations of this insect was recorded throughout Southern Manitoba. Scattered trembling aspen and willow in the Sprague, South Junction and Piney areas again suffered moderate to severe defoliation. Collections were made from two new locations in southeastern Manitoba; the first in the vicinity of Richer and the second near McMunn where light to moderate defoliation of willow occurred. Two collections of this insect were made in the western part of the province; one in the Turtle Mountain Forest Reserve and another on the outskirts of Treherne. Defoliation to trembling aspen was light in both areas.

2.3.25 Red-humped Caterpillar, Schizara concinna A. & F.

Populations of this species showed a marked increase and a much wider distribution throughout Southern Manitoba than in 1955. Defoliation ranged from moderate to heavy, but in most instances was confined to one or two trees in any one area. Moderate to heavy defoliation was recorded on both willow and trembling aspen in the Middlebro, Sprague, Piney and Menisino areas. Light to moderate patches of defoliation occurred throughout the Sandilands Forest Reserve. In the Hadashville-McMunn area defoliation was classed as moderate. Light defoliation was recorded at Richer, La Broquerie and St. Pierre. One small collection of this insect was made from trembling aspen in the vicinity of Elm Creek.

2.3.26 Yellow-necked Caterpillar, Datana ministra (Daury).

Relatively high populations of this insect were again recorded in the Sandilands Forest Reserve, Hadashville and East Braintree regions in 1956. Defoliation of willow and aspen in the above-mentioned areas ranged from moderate to severe, although no large stands of either host were involved. One small collection was taken from willow near Ile des Chenes.

2.3.27 Spotless Fall Webworm, Hyphantria textor Harr.

Surveys for the presence of this insect revealed that the distribution and abundance had increased somewhat in 1956. This species was collected from all of Southern Manitoba whereas in 1955 only the southeast part of the Province appared to be infested. In the southwest portion of the district collections were made at Pipestone, Brandon, Boissevain, Turtle Mountain Forest Reserve, Spruce Woods Forest Reserve and Portage la Prairie. The principal hosts were Manitoba maple, trembling aspen, balsam poplar, willow, alder and chokecherry.

2.3.28 A Leaf Beetle, Chrysomela tremulae Auct.

Relatively high populations of this species were recorded on trembling aspen in the Spruce Woods Forest Reserve. Although defoliation was classed as moderate, several scattered patches of "heavy" occurred throughout the area. The infested area was more or less confined to small patches of second growth trembling aspen in the Camp Hughes and Brandon Junction portions of the Spruce Woods Forest Reserve.

2.3.29 Pine Tortoise Scale, Toumeyella numismaticum (Pettit & McD.).

Several small collections of this insect were made in the Sandilands Forest Reserve. However, populations remained low and in all instances only one or two trees were affected with new scales.

2.3.30 Jack-pine Webworm, Tetralopha robustella Zell.

Population levels of this species remained much the same as in 1955. Jack pine in the area west of South Junction still harboured relatively high numbers of larvae resulting in light to moderate defoliation. Observations and collections indicated that feeding was light at the following places: Sprague, Vassar, Whitemouth Lake, Sundown and throughout the Sandilands Forest Reserve.

2.3.31 Spotted Willow-leaf Beetle, Chrysomela interrupta Auct.

Several scattered collections of this insect were made from willow and alder in the northern part of the Sandilands Forest Reserve. Although populations were relatively high defoliation was classed as light.

2.3.32 Wood Borers

Relatively high populations of a wood borer, Cerambycid sp. were recorded in jack pine stands in the Sandilands Forest Reserve where severe burning occurred during the month of September 1955. Several collections of Saperda calcurata were also taken from trembling aspen in southeastern Manitoba. A number of lodgepole pine plantations in the Spruce Woods Forest Reserve were lightly infested with a wood borer, Buprestid sp.

2.3.33 Other Noteworthy Insects

An increase in a number of minor insects occurred throughout the

District in 1956. These species and number of collections are shown in the following table.

TABLE 10

Other Noteworthy Insects

Host	No. of collections	Locality	Species	Remarks
White spruce	2	S.F.R.	Chermes abietis	Light in this area
" "	1	Sundown	" "	Very few galls
" "	1	S.W.F.R.	" "	Sev. trees heavy infest.
Willow	2	S.F.R.	Nycteola frigidana	Populations light
Balsam poplar	2	S.F.R.	" "	Common on B. poplar
" "	1	Hadashville	" "	" " "
" "	1	McMunn	" "	" " "
Willow	1	East Braintree	" "	Common this area
"	1	Falcon Lake	" "	Populations light
Larch	4	S.F.R.	Semiothisa sexmaculata	" "
Willow Aspen	8	Found throughout district	Halisidota maculata	Common in most areas

2.4 TREE DISEASES CONDITIONS

2.4.1 Mistletoe on Jack Pine, Arceuthobium americanum.

No change in the distribution of this disease occurred in 1956. It is still confined to a very small area in the northern part of the Sandilands Forest Reserve located in Sec. 30, Tp. 7, Rge. 11, E. P. Mer.

2.4.2 Misteltoe on Black Spruce, Arceuthobium pusillum

This disease was commonly found on black spruce throughout southeastern Manitoba. Damage ranged from light to moderate with perhaps the heaviest concentrations being recorded in the black spruce stands between East Braintree and Falcon Lake.

2.4.3 Canker of Poplar, Hypoxylon pruinatum.

Surveys conducted throughout southern Manitoba revealed that this disease was common in most of the trembling aspen stands examined. Several permanent plots examined in southeastern Manitoba showed that between 15 and 25 per cent of the trees were infected.

2.4.4 Black Knot of Cherry, Dibotryon morbosum.

Although this disease was common in all areas travelled, exceedingly heavy concentrations were recorded at Sprague, Menisino, Sandilands Forest Reserve, Hadashville, Richer and in the Spruce Woods Forest Reserve.

2.4.5 Armillaria Root Rot, Armillaria mellea.

This disease was found in only one area in southern Manitoba in 1956. It was recovered from a small red pine plantation, located in Sec, 36, Tp. 7, Rge. 10, E. P. Mer. in the Sandilands Forest Reserve. Several trees in this plantation showed a slight discoloration and examination revealed that this disease was present. Close-growing and crowded root conditions were observed in this planting, and possibly enhanced attack by Armillaria root rot.

2.4.6 Other Noteworthy Diseases

Host	Locality	Causal Organism	Remarks
White spruce	Spruce Woods F.R.	Arceuthobium pusillum	Mistletoe on w.spruce
Tamarack	Sandilands F.R.	Poria sp.	Slash fungus
Jack pine	" "	Cronartium comandrae	Gall rust on stems
Balsam fir	" "	Melampsora sp.	Needle rust
Jack pine	" "	Coleosporium solidaginis	" "
Tamarack	" "	Fomes pini	Red ring rot

2.5 SPECIAL PROJECTS

Several new projects originated at the Winnipeg Laboratory, were carried out during the regular field season in 1956. The following is an outline of the work conducted on these projects.

2.5.1 Phenological Studies

Five sampling stations were chosen in southern Manitoba within which to conduct this study. Four tree species, wherever possible, were selected at each sample point, namely: white spruce, jack pine, trembling aspen, and tamarack. One branch from each of five trees per species was selected and tagged at eye level for ease in locating terminals to be measured. The first measurement of dominant terminal shoots was taken between June 16 and June 28. Selected shoots were again measured after shoot growth was complete, August 19 to September 11. This survey was carried out for the purpose of comparing shoot development in plus or minus day from a common reference point, such as Winnipeg or Red Rock Lake. Other events such as duck migration, first appearance of flies, flowers, etc., were also recorded. The number of sample stations, their location and tree species is shown in the following table.

TABLE 11

Phenological Study Stations

Sample station	Place	Tree species	Location			
			Sec.	Tp.	Rge.	Mer.
1	Turtle Mountain F.R.	White spruce Trembling aspen	3	1	20	W.P.
2	Spruce Woods F.R.	White spruce Trembling aspen Jack pine	20	10	15	W.P.
3	Marchand	White spruce Trembling aspen Jack pine Tamarack	31	5	9	E.P.
4	Sandilands F.R.	White spruce Trembling aspen Jack pine Tamarack	34	7	10	E.P.
5	Sprague	White spruce Trembling aspen Jack pine Tamarack	35	2	15	E.P.

2.5.2 Mortality Counts in Forest Stands

Strip tally counts to record tree mortality were conducted in eight plots in southern Manitoba during the latter part of October. Five jack pine cruise strips were established in the Sandilands Forest Reserve and three white spruce in the Spruce Woods Forest Reserve. In the Sandilands Forest Reserve four cruise strips were set up in jack pine stands infested with the jack pine budworm and one, to be used as a check point, in a non-infested stand. In the Spruce Woods Forest Reserve, two cruise strips were established in stands infested by the spruce budworm and one outside the infested area, also as a check point. Cruise strips were 1/2 chain by 20 chains in size (1 acre) and all trees living and dead were tallied by d.b.h. class. The data obtained from this survey is summarized in Table 12.

TABLE 12

Summary of Cruise Strip Data showing Percentage of Dead Trees by Basal Area and Defoliation History in Jack pine and White spruce Stands in the Sandilands and Spruce Woods Forest Reserves

Cruise strip #	Tree species	d.b.h. living		d.b.h. trees totally dead		Basal Area			d.b.h. Trees with 1/3 or more crown dead		Basal area sq.ft.	Defoliation history	Remarks
		Range	Average	Range	Average	Living	Dead	% loss	Range	Average			
1	jP	1-10"	3.8"	1-6"	2.2"	86.696	1.319	1.48	1-9"	2.4"	.804	1954 - 1955 M 1956 H	Light scale damage.Also a no.of dead leaders
2	jP	1-11"	3.6"	1-10"	2.1"	76.435	6.095	7.38	1-10"	2.1"	1.170	1954 L 1955 M 1956 H	Light scale damage
3	jP	1-13"	7.8"	1-10"	3.0"	55.289	2.410	4.18	1-9"	4.2"	1.199	1954 L 1955 M 1956MH	Light scale damage.Some bark beetles
4	jP	1-13"	4.4"	1-11"	3.9"	57.498	7.171	11.09	3-13"	7.5"	6.374	1954 L 1955MH 1956 H	Light scale damage.Also bark beetles and wood borers
5*	jP	1-10"	3.6"	1-6"	1.2"	62.471	.323	.514	0	0	0	1954 - 1955 - 1956 L	Bark beetle populations light
1	wS	1-16"	4.3"	1-4"	1.5"	70.304	.945	1.33	1-10"	3.1"	1.024	1954 L 1955 L 1956 L	Bark beetle damage light
2	wS	1-16"	4.3"	1-6"	2.1"	53.813	1.297	2.35	1-3"	1.4"	.069	1954 L 1955 L 1956LM	Bark beetle & wood borer populations light to moderate
3*	wS	1-22"	3.8"	1-3"	1.3"	41.577	.165	.395	2-3"	2.5"	.071	1954 L 1955 L 1956 L	Very light wood borer damage

* Cruise strips outside infested area.

2.5.3 Special Collections

A number of special collections were made during the season for personnel of the Winnipeg and other laboratories. The type of collections and where allocated are shown in Table 13.

TABLE 13

Summary of Special Collections

Type of collection and for whom collected	No. of collections	Time spent collecting (including travel)
Spruce budworm larval collection for Dr. G. Stehr, Sault Ste. Marie (200)	1	1 day
Jack-pine budworm larval collection from Scots pine for Dr. G. Stehr, Sault Ste. Marie (200)	1	1 day
Jack-pine budworm larval collection for J. Heron, Winnipeg (700)	1	1 day
Larch sawfly larval collection for W. Ives, Winnipeg (5000)	1	1 day
Aphid collection for G. Bradley Winnipeg	15	2 days
Larch sawfly cocoon collection for Winnipeg Laboratory	4	2 days
Roots of Scots pine and lodgepole pine infested by pine root-collar weevil for Winnipeg Laboratory	1	1/2 day
Spruce budworm pupae collection for Winnipeg Laboratory	1	1 day

2.6 SUMMARY OF INSECT AND TREE DISEASE COLLECTIONS

The following table contains a summary of insect and tree disease collections obtained in the Southern District in 1956.

TABLE 14

Summary of Collections

Host	No. of Insect Collections		No. of tree disease collections
	Ranger	Co-operator	
Tamarack	35	2	4
White spruce	30	6	3
Jack pine	65	7	3
White poplar	45	1	1
Scots pine	9	4	
Lodgepole pine	3	1	
Birch	9	1	
Willow	38	1	
Balsam	15	2	2
Bur oak	7	-	
Manitoba maple	23	-	
Black spruce	6	-	1
Balsam poplar	12	-	
Chokecherry	17	2	2
Alder	5	-	
Elm	7	2	
Red pine	2	3	2
White pine	1	1	
Miscellaneous	4	-	

2.7 PERSONNEL CONTACTED

The following table lists personnel contacted throughout Southern Manitoba during the field season.

TABLE 15

Name	Address	Title	No. of contacts
J.G. Somers	Winnipeg	Provincial Forester	2
W. Webster	"	District Forester	&
C. Smith	"	Forester	&
A. Kotowicz	"	Forester	10
M. Kastrukoff	"	Forester	5
B. Vermilyea	"	District Forester	2
W. Danyluk	Rennie	Forest Engineer	2
B. Gilmore	East Braintree	Forest Ranger	5

Table 15 (continued)

Name	Address	Title	No. of contacts
W. Meseman	Hadashville	Forest Ranger	3
H. Terschman	"	Forest Ranger	&
R. Kemp	Richer	Forest Ranger	4
R. Hill	Marchand	Forest Ranger	&
G. Palmer	Woodridge	Forest Ranger	2
W. Trowsdale	Piney	Forest Ranger	&
E. Harrison	Sprague	Sr. Ranger	&
R. McIntosh	Steinbach	Game Guardian	2
J. J. Wright	Carberry	Sr. Ranger	5
R. Bell	Boissevain	Forest Ranger	1
A. Tinline	"	Peace Garden Supt.	3
W. Ruth	Stead	Forest Ranger	1
F. Hanton	Lac du Bonnet	Pilot	2
D. S. Stevenson	Morris	Ag. Rep.	1
G. A. Arnott	Boissevain	Ag. Rep.	1
P. E. Buclen	Sault Ste. Marie	F.B.R.	1
J. R. McPhee	" " "	F.B.R.	1
P. Perchuk	Sprague	Forest Ranger	2

& Continuous contacts.

3. ANNUAL REPORT OF FOREST BIOLOGY RANGER EASTERN DISTRICT OF MANITOBA

1956

by

A. E. Campbell

INTERIM REPORT - 1956

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

February, 1957

3.1 INTRODUCTION

Field surveys to determine the prevalence of forest insects and tree diseases were conducted in the Eastern District of Manitoba from May 26 to October 26. Major insect outbreaks were mapped and the distribution and abundance of minor insects and tree diseases were recorded.

Several special collections of insect material were made for parasite and disease studies by survey and project personnel at the Winnipeg and other laboratories.

Special surveys were conducted to determine the occurrence and distribution of the spruce budworm, larch sawfly, jack-pine budworm, birch-leaf skeletonizer and the large aspen tortrix. In addition, black spruce stands were examined for the prevalence of a complex of insects attacking heavily coned black spruce tops. Sequential sampling of larch sawfly populations was carried out at eight permanent sample plots. Five additional plots were established to measure and record phenological events for four major tree species. A tenth acre plot was established in a jack pine stand for studies on Retinodiplosis sp., a small midge which causes killing of current shoots of jack pine.

Eight permanent tamarack sample plots and five trembling aspen sample plots were re-tallied to determine the degree of tree mortality by the larch sawfly and forest tent caterpillar, respectively.

Aerial surveys involving approximately 32 hours of flying time were conducted during July, August and September. Surveys covering approximately 100 miles along two of the main watersheds in the Whiteshell Forest Reserve were made by boat.

Three hundred and twenty-five insect collections and 5 tree disease collections were made in 1956. The assistance and co-operation of the Manitoba Government Air Service, Forest Service personnel and private co-operators are gratefully acknowledged.

3.2 REVIEW OF FOREST INSECT AND TREE DISEASES

A general increase in populations and distribution of the spruce budworm occurred in white spruce - balsam fir stands over two areas in the eastern part of the district. One area of this general build up in populations occurred in the north and east sections of the Whiteshell Forest Reserve along the Winnipeg River, and the other runs in a band from the Garner and Bushey lakes along the Manitoba-Ontario boundary northwest through Manigotagan and Wanipigow lakes, across Lake Winnipeg to Pine Dock and the Saint lakes area in the Interlake region. White spruce and balsam fir stands on several of the islands in Lake Winnipeg and Fisher Bay also harbored high populations.

The larch sawfly continued to decline in most parts of the district except for three localized areas where a slight increase in larval populations was noted. Parasites and predators of this insect were again active and undoubtedly are partially responsible for the steady decline of the larch sawfly in many areas.

A general decline in larval populations of the jack-pine budworm occurred in the old infestation areas at Stead, Belair, Rosenburg, and Aikens Lake. This may be attributed, in part, to the absence of staminate flowers on jack pine.

The birch-leaf skeletonizer was more common and widespread in 1956. Browning of white birch foliage by this species was most conspicuous in the Milner Ridge and Beaver Creek regions.

Populations of the yellow-headed and green-headed spruce sawflies remained at low levels throughout the district. The black-headed budworm and the balsam-fir sawfly were generally distributed but caused no appreciable defoliation. Deciduous trees, particularly Manitoba maple, in the shelterbelt areas were moderately defoliated by the fall cankerworm. An infestation of the large aspen tortrix on trembling aspen occurred at Dog Lake in the Interlake region. Pockets of light to moderate defoliation were observed as far east as Poplarfield. The heaviest concentrations of the gray willow-leaf beetle occurred in the interlake region, where light to moderate skeletonizing of willow foliage was observed. Elsewhere in the district only a trace of skeletonizing occurred.

A survey of forest tree diseases indicated that there were no major changes in the status of the more important tree diseases. The dwarf mistletoe on black spruce was collected from two new locations north of Riverton. A light infection of spruce needle rust was noted on black and white spruce in most areas. Red ring rot was collected from two new areas. Special attention was given for the detection of Radulum casearium, a white trunk rot of aspen, and for the occurrence of jack-pine mistletoe in the Whiteshell Forest Reserve and east of Lake Winnipeg to the Manitoba-Ontario border.

3.3 INSECT CONDITIONS

3.3.1 The Spruce Budworm Infestation in Eastern Manitoba

Surveys in 1955 indicated a general increase in populations of the spruce budworm in Eastern Manitoba. The principal infestation bordered a very severe infestation of budworm in Ontario. Most of the infested white spruce and balsam fir stands in Manitoba were near the shores of Lake Winnipeg and along watersheds east of the lake. Extensive aerial surveys of this area were carried out in 1956. Flight facilities included 20 hours chartered flying with Central Northern Airways, 5 1/2 hours co-operative flying with the Manitoba Forest Service and 6 hours co-operative flying with the unit of Forest Biology, Sault Ste. Marie.

Survey Methods

Aerial Surveys - Four flight plans requiring 32 hours flying and representing some 3500 air miles were used for aerial surveys. These included 2 blocks covering areas known to be infested in 1955, and 2 random line surveys along the northern watersheds, and along the Manitoba-Ontario border, to detect possible extensions of the infestation in 1956. A map of the flight plans is shown in Figure 1.

EASTERN DISTRICT MANITOBA

FOREST INSECT AND DISEASE SURVEY · WINNIPEG

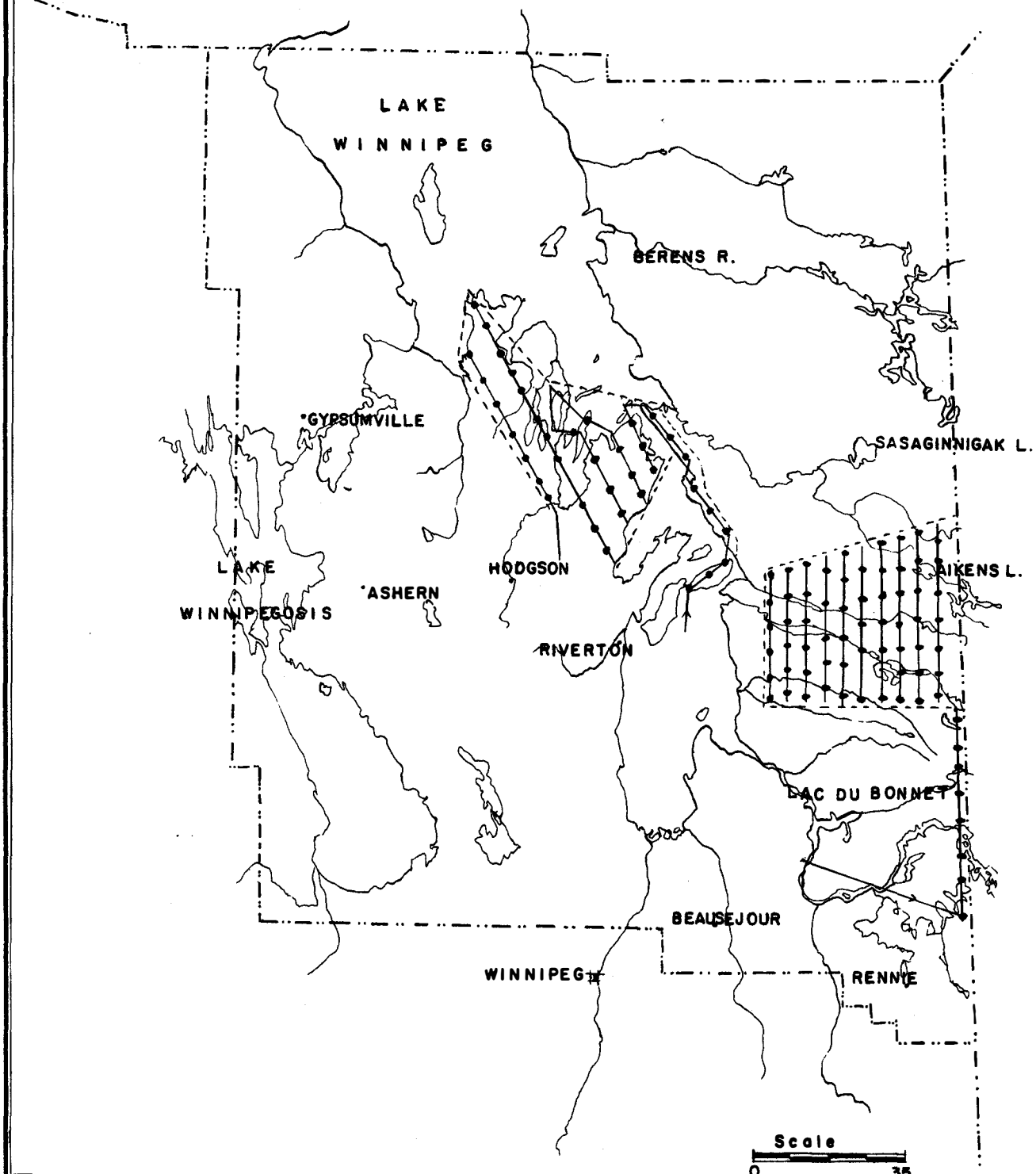
FIG. 1

FLIGHT PLAN OF THE AERIAL SURVEYS OF SPRUCE BUDWORM INFESTATIONS 1956

FLIGHT LINES

OBSERVATION POINTS

FLIGHT BOUNDARIES



Aerial surveys were conducted during the period most suitable for mapping defoliation from the air, which in 1956 was in early July. For the block surveys the aircraft carried two observers, each using a different system of recording and mapping. One observer made regular interval recordings on stand type and defoliation, along each flight. The recordings were later plotted and used for drawing up infestation maps. This system is essentially the same as that used for mapping extensive infestations in New Brunswick. The efficiency of this method depends on the speed at which the observer can make recordings and his ability to interpret conditions as seen from the air. Trials in 1956 showed that observations and recordings could not be made in less than 3 minute intervals. This was partly due to the inexperience of the observer. Flying at 100 miles an hour observations and recordings would be approximately 5 miles apart. In the area involved, infestation often occurred in narrow bands, 2-3 miles wide, which were easily missed in recordings. Also, small infestations frequently fell between flight lines. The second observer in the aircraft did not abide by time interval recordings. He simply made observations to the left and right of the flight lines and mapped infested areas directly on a large scale map. This system appeared to be most suitable for the infestations conditions found in eastern Manitoba, particularly for areas where forest types change rapidly. It was the only method used on the other two flight plans. The aircraft landed at most of the larger lakes in the infestation area and ground checks were made to confirm aerial observations and recordings..

Ground Surveys - Ground surveys by truck and boat were made of all accessible spruce and balsam fir stands in the district. At representative points, records were made on defoliation of current and old shoots, and tree mortality. In addition mass collections of larvae and pupae were submitted to the Winnipeg Laboratory and reared for estimates on parasitism and disease.

Egg Surveys - Following the period of moth flight and oviposition in 1956, egg surveys were conducted in order to predict the probable infestation conditions for 1957. At representative points, sample branches were taken from the mid crown of balsam fir trees and checked for egg masses. On the basis of the number of egg masses per a hundred square feet of foliage it was possible to predict the infestation for 1957 in terms of light, moderate or severe.

Infestation Ratings

For aerial surveys, infestations were rated by the degree of redness of spruce and balsam fir foliage, caused by budworm feeding. Three broad categories of light, moderate and severe were defined as follows:

light:	Trees only slightly red at the tip of crown. (Light defoliation was usually confirmed by ground observations).
moderate:	Redness clearly evident from the air. Some green foliage mixed with it.
severe:	Foliage red over the entire crown - little or no green foliage showing.

During ground surveys infestation ratings were based primarily on defoliation estimates. By examining sample branches it was possible to estimate the percentage of the current and old foliage which had been eaten by budworm. However, to facilitate mapping, ground estimates of percentage defoliation were also grouped into the categories of light, moderate and severe as follows:

light:	Up to 20 per cent of the current foliage lost.
moderate:	20-60 per cent of current foliage lost.
severe:	60-100 per cent of current foliage and in some cases back feeding on old foliage.

No adequate egg sampling techniques have been developed for white spruce. For this reason egg surveys were limited to areas where balsam fir occurred. On the basis of the number of egg masses per hundred square feet of foliage, infestation forecasts for 1957 were drawn up as follows:

light:	25 or less egg masses per 100 sq. ft. of foliage.
moderate:	50-100 egg masses.
severe:	200 or more egg masses.

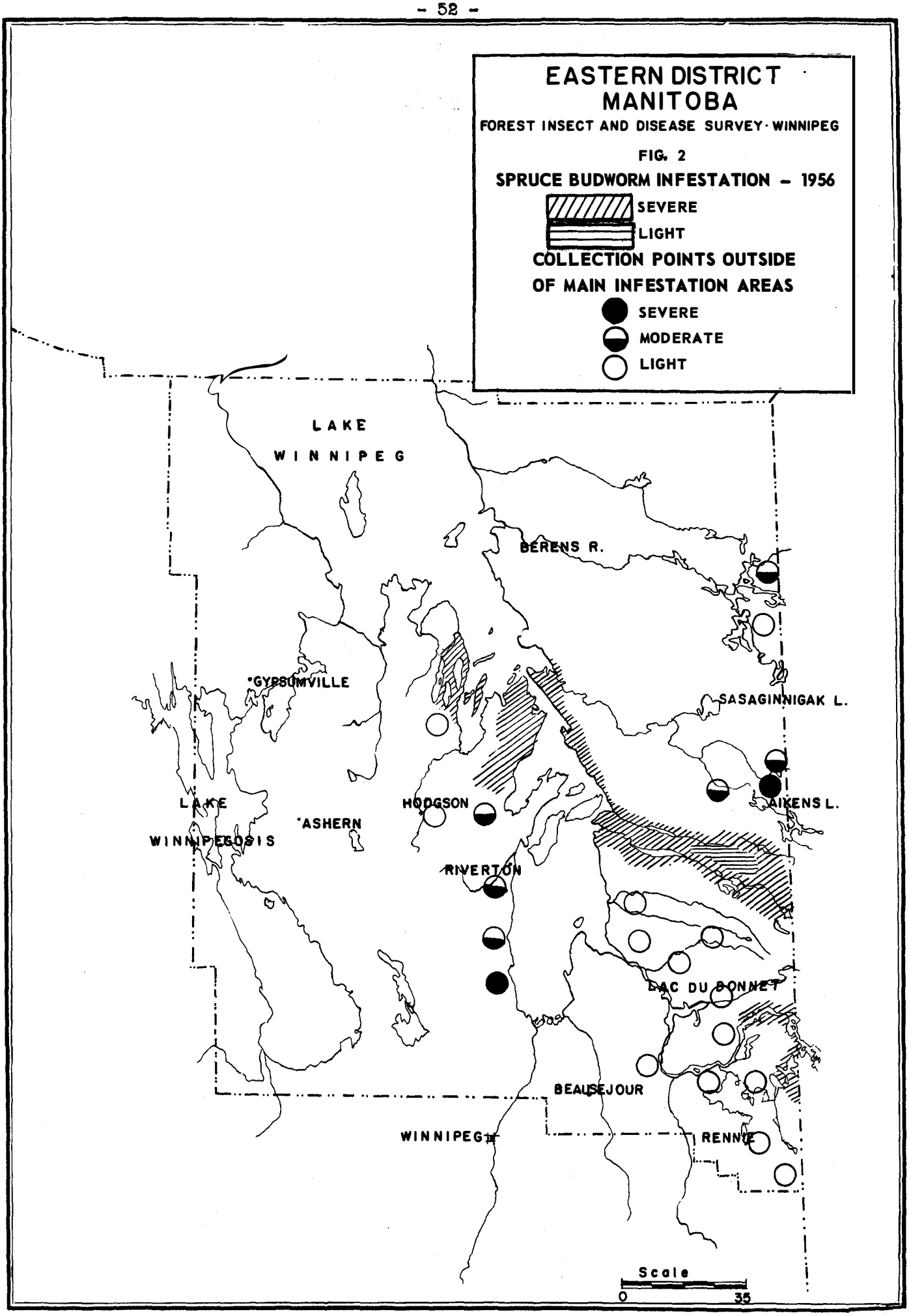
Results of Aerial and Ground Surveys

Surveys in 1956 showed that there are two main infestations in eastern Manitoba. The first lies through the northeast section of the Whiteshell Forest Reserve and is actually an extension of the infestation in the Kenora-Sioux Lookout districts of Ontario.

The other infestation extends in a northwest band from the Ontario boundary, along the Manigotagan and Wanipigow rivers, through islands in Lake Winnipeg to the northern portion of the interlake region. The two main infestation areas described above are shown in Figure 2.

The infested area in the Whiteshell Forest Reserve increased from a few acres in 1955 to approximately 75 square miles in 1956. It extends north from Crowduck Lake along the Winnipeg River to a point seven miles east of Pointe du Bois. Ground checks to confirm aerial surveys were made in early August at Eaglenest Lake, Lamprey Falls and in the vicinity of the tram line. Current defoliation at these points ranged from light to severe. A 50-60 year old balsam fir stand on an island west of the tram line suffered 100 per cent defoliation of the current foliage. Some back feeding on last year's foliage was evident in this area. It was noted that heavy staminate flower production had occurred in 1953.

Light to moderate defoliation occurred in lightly stocked stands near Lamprey Falls and Eaglenest Lake. There was evidence of old defoliation on spruce and balsam in these areas. It was also noted that heavy staminate flower production had occurred on balsam in 1951, 52, 53, and 1954.


EASTERN DISTRICT
MANITOBA
FOREST INSECT AND DISEASE SURVEY · WINNIPEG
FIG. 2
SPRUCE BUDWORM INFESTATION - 1956
SEVERE
LIGHT
COLLECTION POINTS OUTSIDE
OF MAIN INFESTATION AREAS
SEVERE
MODERATE
LIGHT
LAKE
WINNIPEG
BERENS R.
GYPSUMVILLE
SASAGINNIGAK L.
LAKE
WINNIPEGOSIS
ASHERN
HODGSON
AIKENS L.
RIVERTON
LAC DU BONNET
BEAUSEJOUR
WINNIPEG
RENNIE
Scale
0
35

Surveys through the spruce and balsam fir stands on the Manitoba Paper Company timber berths along the Bird and Bear rivers revealed only a trace of defoliation. The balsam fir sampled in these areas were in the 100 year age class. Heavy staminate flower production occurred in 1947, 48, 49, 50, and 1952.

The budworm situation through the Manigotagan and Wanipigow rivers and into the interlake region was similar to that in the Whiteshell Forest Reserve. The small but severe infestations which occurred in 1955, increased in size and intensity and covered an area of approximately 460 square miles. The most significant increase in these areas occurred in the interlake region and on several islands in Lake Winnipeg. In these areas infested spruce and balsam fir stands increased from 60 square miles in 1955 to approximately 345 square miles in 1956. Typical reddening of foliage was most conspicuous on Matheson Island and in the vicinity of Pine Dock and Beaver Creek. Ground checks revealed severe defoliation of the current growth of spruce and balsam fir. Moderate defoliation occurred along the west shore of Fisher Bay and in the vicinity of Lake St. George. Similar conditions were noted on Black and Blackbear islands.

Surveys of the major watersheds from the Wanipigow north to the Poplar River revealed no trace of budworm activity. Spruce budworm surveys along the Manitoba-Ontario boundary revealed moderate budworm activity at Artery and Moar lakes.

Light to moderate defoliation of white spruce occurred in farm shelterbelts from Hnausa west to Arborg and in the vicinity of Riverton. South of these areas similar conditions were noted on white spruce in the resort areas of Gimli and Winnipeg Beach. Budworm conditions in these areas were aggravated by the severe winter drying of foliage on many spruce trees. Past records of budworm infestations indicate that mortality of balsam fir commences following three to four years of severe defoliation. White spruce, on the other hand, can usually survive up to five years of severe attack before showing any appreciable mortality. One of the first tree responses to continuous defoliation, and a condition which usually preceeds mortality, is the abnormal production of adventious growth. This condition was most conspicuous in the old infestation areas at Pine Dock and Wallace Lake. Figures 4 and 5 show severe defoliation of young balsam south of Pine Dock and Figure 6 shows similar conditions of balsam at Wallace Lake. Reduced foliage production of white spruce and balsam fir was evident in most of the old infestation areas, and light host tree mortality was noted at Wallace and Garner lakes east of Lake Winnipeg. In the interlake region a lighter degree of host tree mortality occurred south of Pine Dock.

No budworm moth flights were observed during the survey. However, thousands of budworm moths were disturbed while walking through the infestations. A note of interest was the strong south winds which occurred during the egg laying period.

Natural Control Factors

The results of mass collections and rearings of larvae and pupae from representative points in the infestation, indicate that parasites and disease caused relatively light mortality in 1956. In the Winnipeg Beach area the total parasitism based on rearings was about 40 per cent. However at most sample points

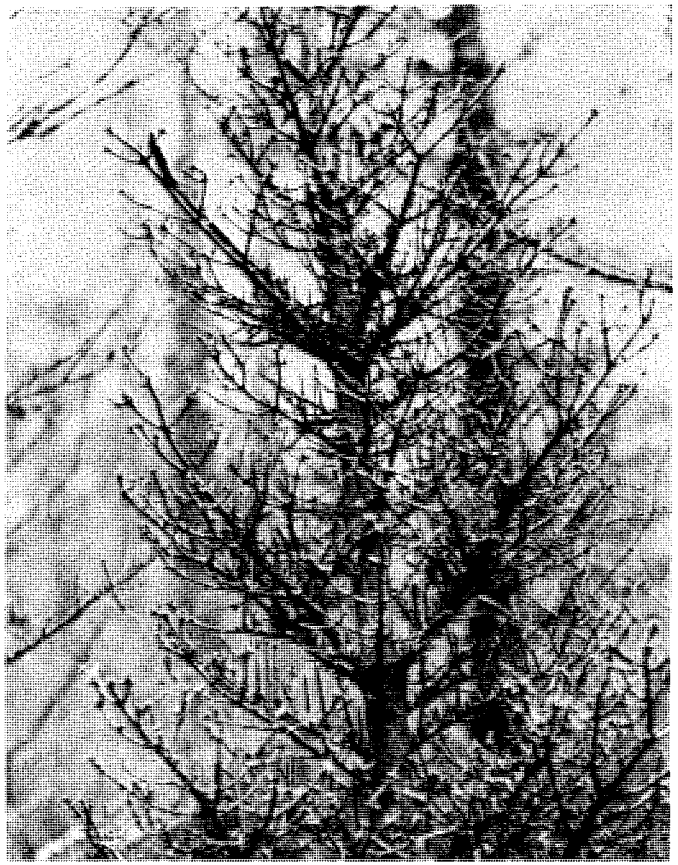


Fig.4

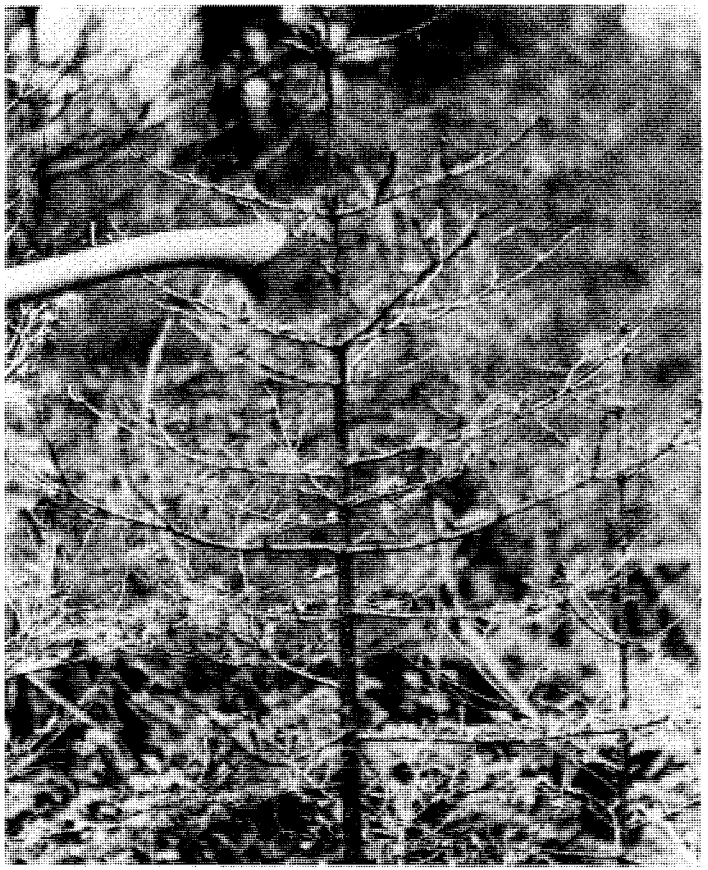


Fig.5

Figs.4 and 5. Defoliation of Balsam Fir by Choristoneura fumiferana. Pine Dock, Man.
Photographs by W.A. Reeks.
Negative Numbers W-485
W-486

Fig.6

Defoliation of White Spruce and Balsam Fir by Choristoneura fumiferana. Wallace Lake, Man. Photograph by E.A. Campbell. Negative Number W-493

parasitism was between 10 and 20 per cent. Glypta fumiferanae (Vier), Meteorus trachynotus (Vier), Phaeogenes hariolus (Cress.) and Pseudosarcophaga affinis (Fall.) were the major larval parasites. The most common pupal parasite was Itoplectis conquisitor (Say).

The percentage of parasitism at various points based on larval and pupal rearings is shown in Table 1.

Table 1.

Place	Tree species	Grid	Type of collection		Percent parasitism					
					Larvae			Pupae		
			larva	pupa	Dip.	Hym.	Chalcid	Dip.	Hym.	Chalcid
Pine Dock #1	bF	7-088-284	200	200	nil	0.5	nil	nil	12.0	1.0
Pine Dock #2	bF	7-089-283	200	200	0.5	2.5	nil	2.0	5.5	nil
Pine Dock #3	bF	7-087-278	200	200	3.5	3.0	nil	2.5	12.0	nil
Gimli	wS	7-087-266	200	200	15.5	1.2	nil	5.0	13.5	0.5
Winnipeg Beach	wS	7-087-265	200	200	28.5	nil	nil	9.0	8.5	0.5
Garner Lake	bF	6-019-270	---	100	----	---	---	nil	2.0	1.0
Bushey Lake	bF	6-018-278	---	75	----	---	---	nil	6.6	nil
Wallace Lake	bF	6-018-273	---	100	----	---	---	nil	11.0	1.0
Wanipigow Lake	bF	7-098-275	---	100	----	---	---	3.0	10.0	nil
Manigotagan Lake	bF	6-015-271	---	100	----	---	---	3.0	10.0	2.0
Loon Straits	bF	7-091-282	---	100	----	---	---	3.0	10.0	nil

Relatively few diseased larvae were recovered from mass collections and rearings. Polyhedra virus occurred in collections from Loon Straits and Winnipeg Beach. Microsporidia was also isolated from collections at Winnipeg Beach.

Infestation Forecasts for 1957

The infestation foredast based on egg surveys at points in eastern Manitoba are summarized in Table 2. Also shown are infestation records for the past two years.

Table 2.

Location	Grid	Defoliation prior to 1956	Defoliation record 1956	Predictions for 1957
Eaglenest Lake	6-019-262	light	moderate	severe
Garner Lake	6-019-270	moderate	severe	severe
Bushey Lake	6-018-278	mod-severe	moderate	moderate
Manigotagan Lake	6-015-271	moderate	severe	severe
Wanipigow Lake	7-098-275	moderate	severe	severe
Pine Dock #1	7-088-284	moderate	severe	severe
Pine Dock #2	7-089-283	moderate	severe	severe
Pine Dock #3	7-087-278	moderate	severe	severe
Black Island	7-093-278	moderate	severe	severe
Whiteshell Rd.	6-015-256	nil	nil	light

Infestation forecasts are plotted in Figure 3. Indications are that in 1957 high populations of budworm will be restricted to about the same areas as in 1956. In the area presently involved there is little chance of the infestation expanding. Along the Wanipigow and Manigotagan rivers, and the shores of Lake Winnipeg the infestation boundaries are limited by the forest type. The areas most susceptible to a further extension of the infestation lie through the northern portion of the interlake region and along watersheds north of the Wanipigow River. Intensive surveys will be extended to these areas in 1957.

3.3.2 Larch Sawfly, Pristiphora erichsonii (Htg.)

Ground and aerial surveys of tamarack stands throughout the district showed that population levels of the larch sawfly are about the same as in 1955, except for three areas where moderate sawfly populations still persist.

Population sampling was continued, in permanent tamarack plots. However, a slight modification in the sampling procedure was employed. Replacing the 20-branch method used in previous years, a sequential scheme for sampling egg populations of the larch sawfly was applied at all eight permanent sampling plots.

The infestations at each plot were rated on the percentage utilization of current shoots for oviposition by adult sawflies. Egg counts and infestation ratings for 1956 together with the infestation ratings for 1955 and 1954 are shown in Table 3.

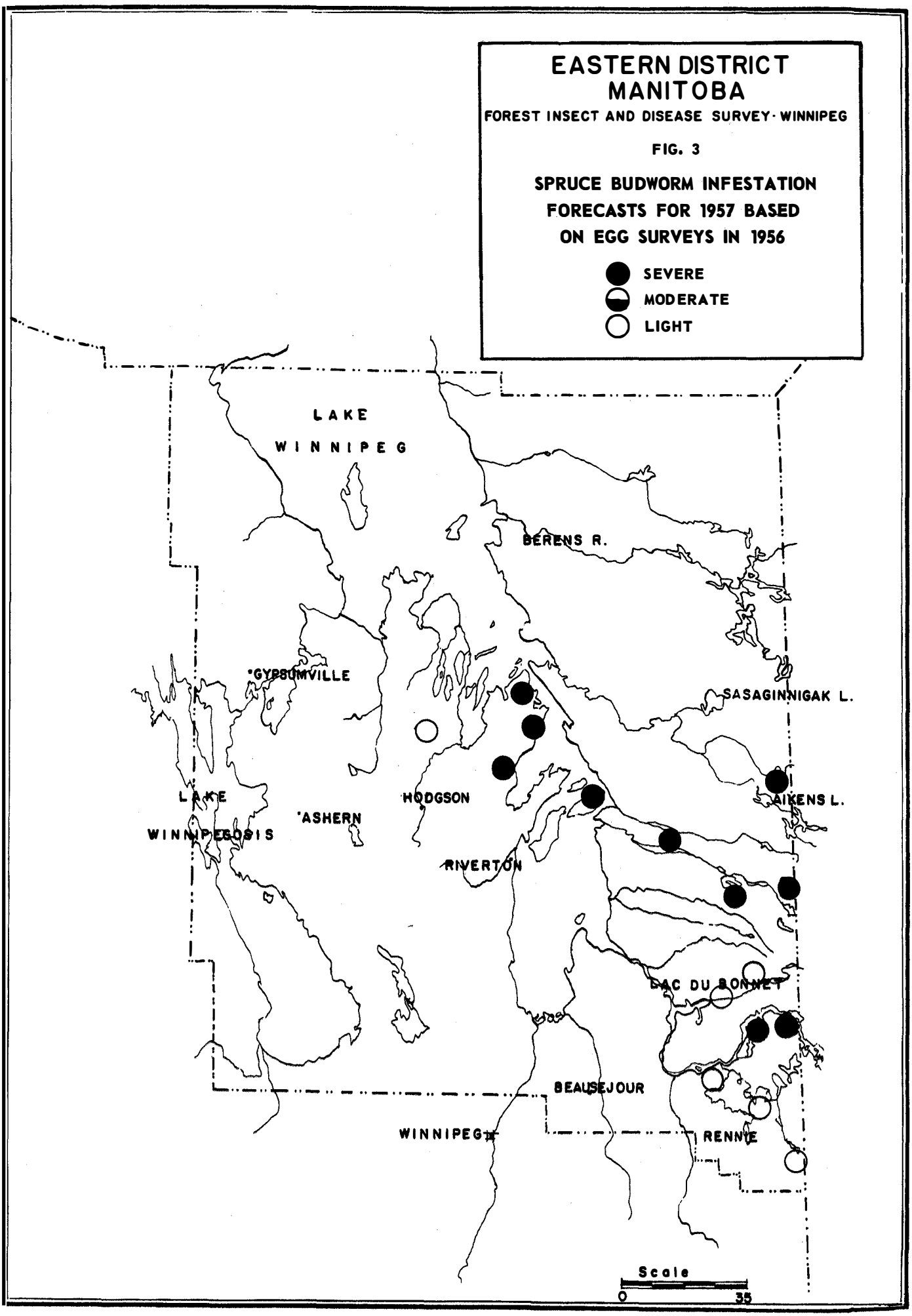
Table 3.

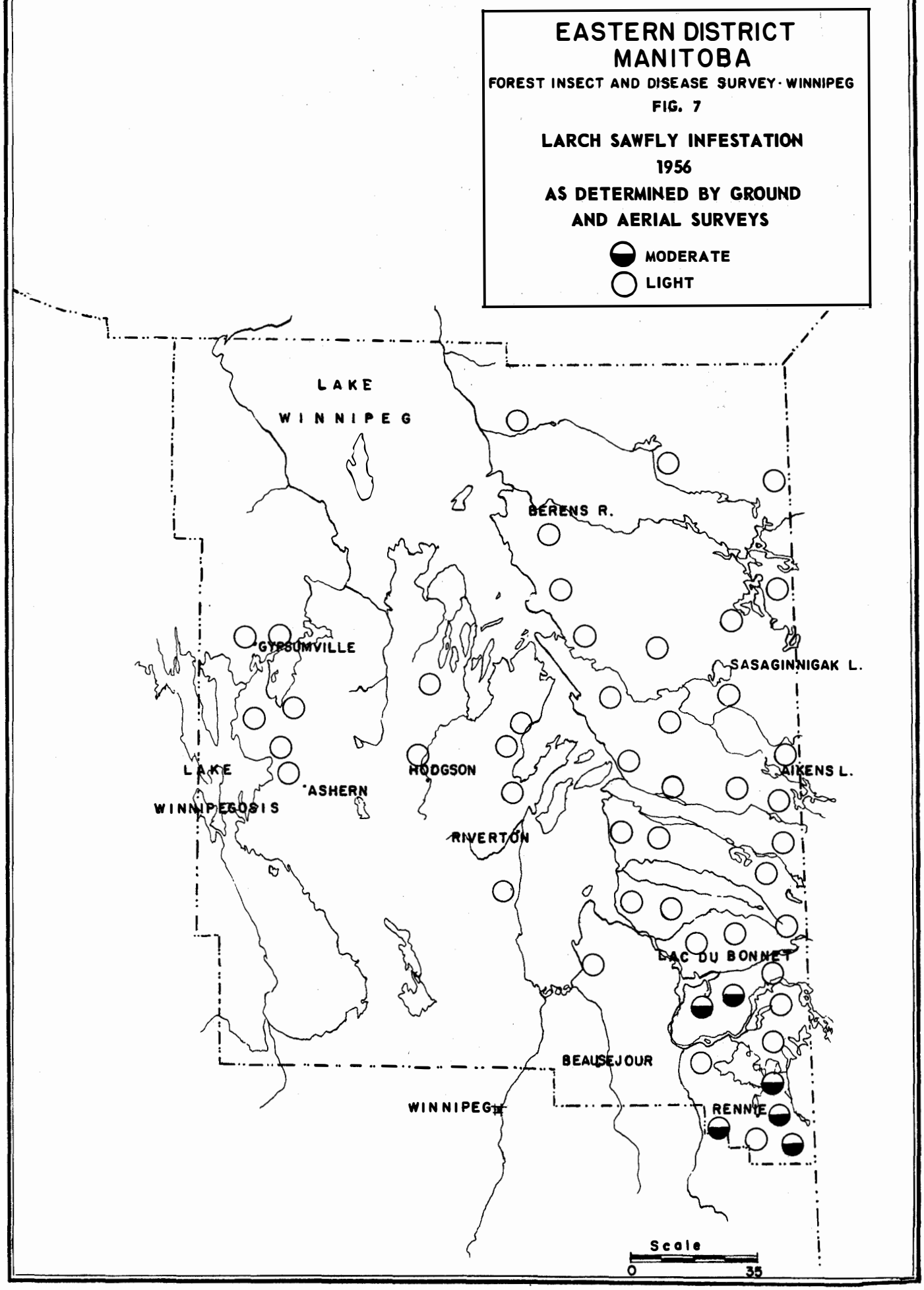
Egg Population Counts of the Larch Sawfly

Plot No.	Place	Sec.	Tp.	Rge.	Mer.	Results of Sequential sampling -- 1956		Infestation Rating 1954-56		
						Total shoots examined	No. of curled shoots	1954	1955	1956
101	Rennie	10	11	13	E.P.	100	18	M	L	M
102	Rennie	22	10	15	E.P.	120	17	M	L	M
103	Telford	17	10	16	E.P.	160	10	L	L	L
105	West Hawk L.	29	9	17	E.P.	190	13	M	L	L
108	Pointe du Bois	25	15	11	E.P.	60	1	M	L	L
109	Lac du Bonnet	30	15	12	E.P.	290	34	L	L	M
110	Seddons Corner	5	13	9	E.P.	260	20	L	L	L
175	Gypsumville	23	32	9	W.P.	50	0	L	L	very L

The distribution and infestation ratings of the larch sawfly in the Eastern District as determined by ground and aerial surveys are shown in Figure 7.

In the Whiteshell Forest Reserve, light to moderate defoliation occurred in two small tamarack stands in sec. 22, tp. 10, rge. 15, E.P. mer and in


EASTERN DISTRICT
MANITOBA
FOREST INSECT AND DISEASE SURVEY - WINNIPEG
FIG. 3
SPRUCE BUDWORM INFESTATION
FORECASTS FOR 1957 BASED
ON EGG SURVEYS IN 1956
SEVERE
MODERATE
LIGHT
LAKE
WINNIPEG
BERENS R.
GYPSUMVILLE
SASAGINNIGAK L.
LAKE
WINNIPEGOSIS
ASHERN
HODGSON
AIKENS L.
RIVERTON
LAC DU BONNET
BEAUSEJOUR
WINNIPEG
RENNIE
Scale
0
35


EASTERN DISTRICT
MANITOBA
FOREST INSECT AND DISEASE SURVEY - WINNIPEG
FIG. 7
LARCH SAWFLY INFESTATION
1956
AS DETERMINED BY GROUND
AND AERIAL SURVEYS
MODERATE
LIGHT
LAKE
WINNIPEG
BERENS R.
GYPSUMVILLE
SASAGINNIGAK L.
LAKE
WINNIPEGOSIS
ASHERN
HODGSON
AIKENS L.
RIVERTON
LAC DU BONNET
BEAUSEJOUR
WINNIPEG
RENNIE
Scale
0
35

sec. 10, tp. 11, rge. 13, E.P. mer. Only a trace of sawfly activity was noted along the central road from Rennie through Brereton, White, Big Whiteshell and Betula lakes and along the Winnipeg River in the vicinity of Nutimik, Dorothy and Eleanor lakes to Seven Sisters. There was evidence of light feeding on tamarack near Telford and West Hawk Lake. In other tamarack stands examined through the Whiteshell, defoliation was negligible.

The larch sawfly was present in small numbers on scattered tamarack stands along the Bear and Manigotagan river roads. For the third consecutive year light to moderate defoliation occurred in two small tamarack stands between Lac du Bonnet and Pointe du Bois (one in sec. 30, tp. 15, rge. 12, E.P. mer.and the other in sec. 25, tp. 15, rge. 11, E.P. mer. In other stands examined in this area defoliation was negligible). Surveys in the interlake region indicated very low populations of the larch sawfly. Traces of feeding occurred on tamarack north of Riverton to Pine Dock, and in the vicinity of Hodgson, Dallas and Lake St. George. Similar conditions existed in the Ashern, Grahamdale and Gypsumville areas.

Mass collections of larch sawfly cocoons were again taken from seven permanent sample plots. The cocoons were later dissected to determine the incidence of parasites attacking larvae of the larch sawfly.

Table 4 gives the number of cocoons collected and the collection points.

Table 4.

Plot No.	Location	Sec.	Tp.	Rge.	Mer.	Grid	No. of Cocoons
101	Rennie	10	11	13	E.P.	6-015-254	100
102	Rennie	22	10	15	E.P.	6-015-254	100
103	Telford	17	10	16	E.P.	6-016-253	100
105	West Hawk Lake	29	9	17	E.P.	6-018-251	100
108	Lac du Bonnet	25	15	11	E.P.	6-010-261	100
109	Pointe du Bois	30	15	12	E.P.	6-010-261	100
110	Seddons Corner	5	13	9	E.P.	7-093-257	100
Picnic Swamp	Red Rock Lake	17	12	15	E.P.	6-015-256	100

The results of cocoon dissections are shown in Table 5. Bessa harveyi (Tnsd.) and Mesoleius tenthredinis Morley were the only parasites recovered. B. harveyi was again the most important parasite of the larch sawfly. Parasitism by this species ranged from 18 to 45 per cent. There was little change in the effective parasitism by M. tenthredinis in 1956.

Table 5.

Summary of Larch Sawfly Parasitism and Disease Determined by Dissections

Place	No. of cocoons dissected	No. of larch sawfly larvae containing Mesoleius tenthredinis		Percent effective parasitism of living larvae		% larvae destroyed by fungus disease	% larvae dead from other causes
		Eggs	Larvae	Bessa harveyi	Mesoleius tenthredinis		
Rennie	100	10	1	28.8	1.7	34.0	7.0
Rennie	100	1	0	18.1	0	1.0	1.0
Telford	100	0	2	40.6	3.1	3.0	33.0
West Hawk Lake	100	2	0	45.3	0	9.0	16.0
Lac du Bonnet	100	4	3	21.3	3.4	11.0	0.0
Pointe du Bois	100	0	1	43.0	1.6	34.0	2.0
Seddons Corner	100	0	1	35.4	1.7	5.0	2.0
Red Rock Lake	100	1	1	34.8	1.0	3.0	2.0

Table 6.

Summary of Permanent Tamarack Plots in the Eastern District of Manitoba Showing Percentage Dead Trees by Basal Area and History of Larch Sawfly Defoliation during Period shown by Tally Years

(Percentage of Wood Loss being the Cumulative Mortality)

Plot No.	Tally year	Tamarack only				Basal area sq.ft.			Total all species Basal area			Defoliation history of tamarack		Remarks
		d.b.h. Living trees		d.b.h. Dead trees										
		Range	Average	Range	Average	Living	Dead	% loss	Living	Dead	% loss	Year	%	
101	1949	1-9	4.76	1-5	1.81	19.048	.611	3.11	--	--	--	1949	70	Undisturbed-swamp dry, drainage ditch near plot, bark beetles present on most dead trees, many wind falls, foliage production fair
												1950	45	
												1951	75	
												1952	78	
												1953	50	
	1956	2-9	5.42	1-5	2.50	13.881	1.045	7.00	--	--	--	1954	14	
												1955	.08	
												1956	22	
102	1949	1-6	1.60	1-2	1.20	15.875	.276	1.71	--	--	--	1949	32	Undisturbed-swamp usually wet, foliage production good, adventitious growth on most tagged trees
												1950	9	
												1951	19	
												1952	42	
												1953	43	
	1956	1-6	1.78	1-0	1.00	11.231	.125	1.10	--	--	--	1954	42	
												1955	11	
												1956	7.5	
103	1949	2-10	4.59	1-4	1.31	31.301	.894	2.78	--	--	--	1949	60	Disturbed-grass fires, plot borders CPR right of way-most dead trees in plot caused by repeated burning. Some cutting noted in plot area
												1950	63	
												1951	68	
												1952	91	
												1953	29	
	1956	2-8	5.26	1-9	3.45	12.031	10.419	46.43	--	--	--	1954	21	
												1955	0	
												1956	4	
105	1949	2-9	5.18	1-6	3.07	17-502	1.680	8.75	--	--	--	1949	71	Undisturbed-swamp wet in early summer, then usually dries up. Adventitious growth on most mature tL. Eight tree species in plot.
												1950	59	
												1951	44	
												1952	90	
												1953	75	
	1956	3-8	6.16	1-6	3.75	10.698	2.509	18.99	--	--	--	1954	20	
												1955	0	
												1956	7	

Table 6. (con't.)

Plot No.	Tally year	Tamarack d.b.h. Living trees Range	Tamarack d.b.h. Living trees Average	Tamarack d.b.h. Dead trees Range	Tamarack d.b.h. Dead trees Average	Basal area sq.ft. Living	Basal area sq.ft. Dead	Basal area sq.ft. % loss	Total all species Basal area Living	Total all species Basal area Dead	Total all species Basal area % loss	Defoliation history of tamarack Year	Defoliation history of tamarack %	Remarks
108	1949	1-7	3.80	1-6	1.66	3.236	.253	7.22	--	--	--	1949	41	Disturbed-plot on private lands. Usually moist, foliage production fair. Xmas trees cut winters 1954 and 55. 90% bS, 10% tL in plot.
												1950	42	
												1951	51	
												1952	28	
												1953	7	
	1956	2-6	3.80	3-7	4.33	1.731	.365	17.46	--	--	--	1954	26	
												1955	1	
												1956	10	
109	1949	1-8	2.48	1-3	1.73	2.459	.454	15.58	--	--	--	1949	41	Disturbed-plot on private lands, usually dry, drainage ditch, many Xmas trees cut in 1954, 1955. Some adventitious growth on main stem of tL, foliage production fair
												1950	58	
												1951	76	
												1952	61	
												1953	20	
	1956	1-7	2.97	1-7	2.27	2.285	.494	17.78	--	--	--	1954	28	
												1955	4	
												1956	16	
110	1950	1-7	1.85	1-4	2.00	10.282	.368	3.46	17.461	1.175	6.30	1950	18	Disturbed-plot on private lands, usually wet - some cutting in plot area. Increased sawfly activity noted in 1956
												1951	59	
												1952	67	
												1953	8	
	1956	1-6	2.35	1-2	1.27	2.662	.106	3.82	--	--	--	1954	4	
												1955	0	
												1956	21	
175	1949	2-5	3.83	1-4	1.64	2.552	1.969	43.70	--	--	--	1949	37	Disturbed-plot on road allowance, grazed - cutting in plot area. tL open growing, foliage production good. Swamp dry
												1950	32	
												1951	27	
												1952	31	
												1953	15	
	1956	1-6	2.61	1-0	1.00	3.197	.030	.93	--	--	--	1954	0	
												1955	0	
												1956	0	

In 1949 and 1950 eight tamarack plots were established in the eastern Manitoba for the purpose of studying tamarack mortality caused by larch sawfly attacks. The plots ranged in size from 1/10 to 1/2 acre. All living and dead trees in the plot areas were tallied and recorded at the time the plots were established. Annual defoliation records were maintained on 10 tagged trees in each plot throughout the infestation period. The plots were retallied in 1956 in order to determine the degree of tree mortality. The percentage of loss by basal area together with defoliation records for the eight plots are shown in table 6.

3.3.3 Jack-pine budworm, Choristoneura pinus Free.

There was a marked reduction in populations of the jack-pine budworm in stands that had suffered severe defoliation in past years. The decline in budworm populations in these areas was attributed to the high incidence of larval and pupal parasitism in 1955, and the absence of staminate flowers in 1956. Despite the widespread reduction in larval populations in the old infestation areas, it was noted that the occasional tree within these areas with fair staminate flower production harbored fairly large numbers of budworm larvae. Discoloration of jack pine foliage, characteristic of jack-pine budworm feeding, was not conspicuous in 1956. Light to moderate defoliation occurred in a small jack pine stand southwest of Stead in tp. 15, rge. 7, E.P. mer.

3.3.4 Birch-leaf Skeletonizer, Bucculatrix canadensisella Chamb.

A general increase in the distribution and abundance of the birch-leaf skeletonizer occurred on most white birch stands for the second consecutive year. Figure 8 shows the general distribution and intensity of this insect throughout the district. Surveys indicated high populations on white birch in the vicinity of Milner Ridge, Lac du Bonnet and Pointe du Bois in the southeast section of the district. In the interlake region, similar conditions existed north and south of Beaver Creek. Light skeletonizing was also evident in small stands of white birch in the Hodgson and Gypsumville areas. Severe browning of birch foliage occurred in sec. 3, tp. 17, rge. 11, E.P. mer., south of Great Falls. A lesser degree of browning was noted in the vicinity of Pine Falls and along the Bear and Black river roads.

Reproduction and mature white birch in the vicinity of Beaver Creek fire tower suffered moderate to severe skeletonizing. Figure 9 shows typical feeding damage on birch foliage in this area.

3.3.5 Large Aspen Tortrix, Choristoneura conflictana (Wlkr.).

An infestation of the large aspen tortrix on trembling aspen stands occurred in the interlake region. Surveys conducted June 27-29 showed that an area of 250 square miles of aspen was lightly to severely defoliated, in the vicinity of Dog Lake, Pebble Beach, Camper, Mulvihill, Eriksdale, Ashern and west to Dolly Bay. Figure 10 shows the boundries of the infested area.

At the time of the survey, large numbers of adult moths were disturbed when walking through the infested area. It was noted that female moths were in the process of egg laying. Egg counts were made at two representative points in the infestation to determine the probable intensity of infestations likely

EASTERN DISTRICT MANITOBA

FOREST INSECT AND DISEASE SURVEY · WINNIPEG

FIG. 8

BIRCH-LEAF SKELETONIZER INFESTATION 1956 AS DETERMINED BY GROUND SURVEYS

MODERATE

LIGHT

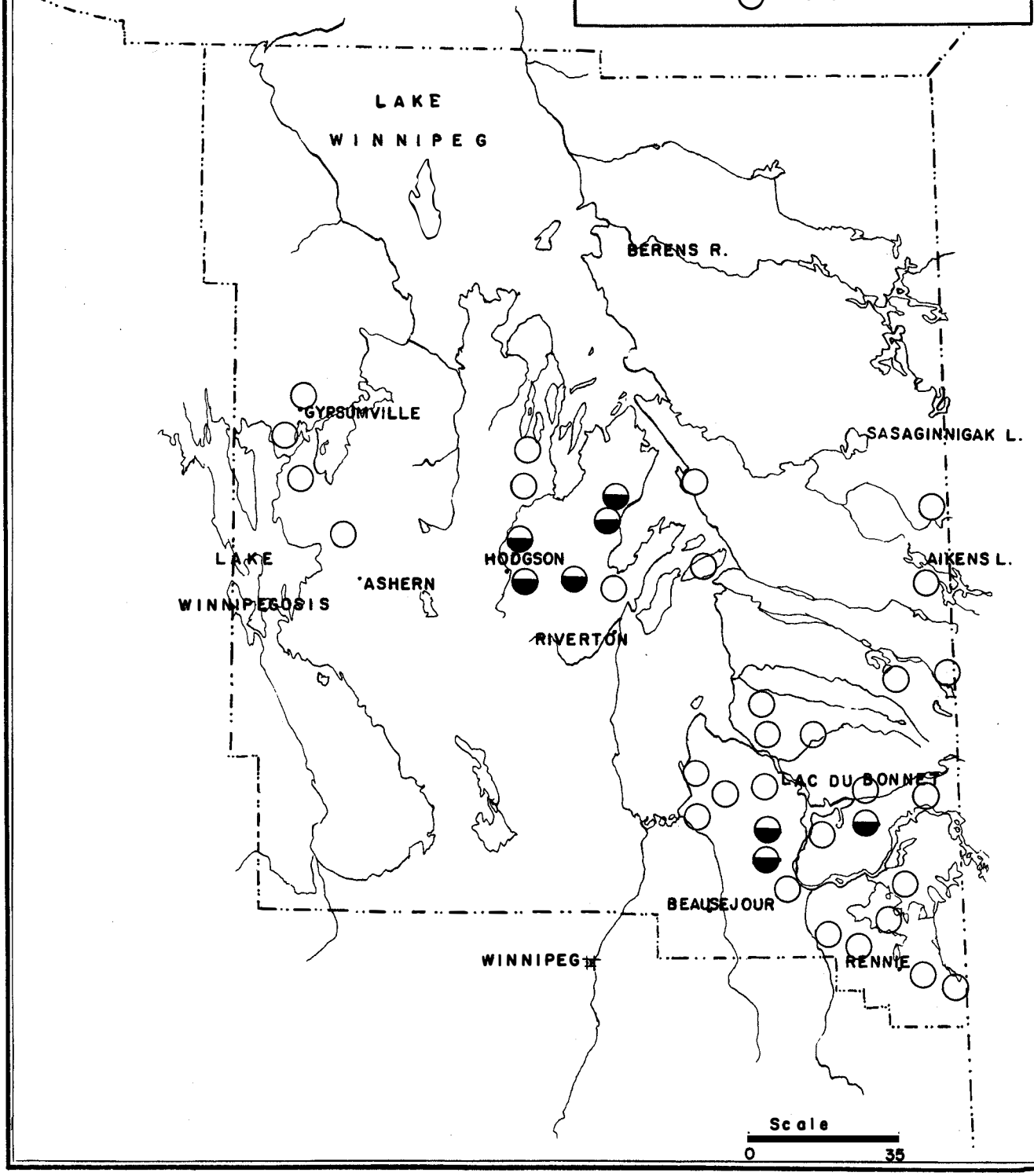
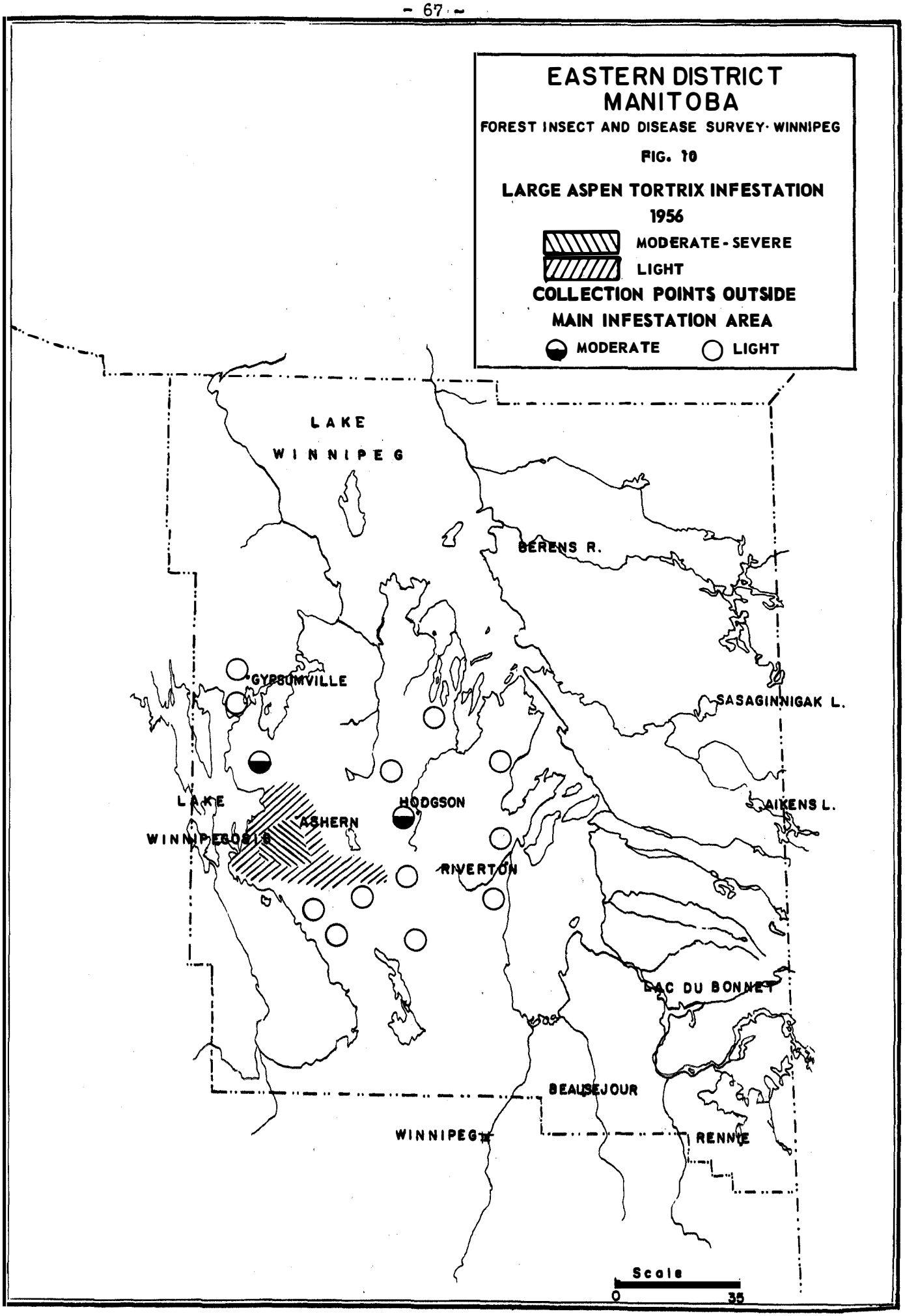


Fig.9

White Birch Foliage Skeletonized by Bucculatrix canadensisella. Beaver Creek, Man.
Photograph by K. Mortenson.
Negative Number W-483


EASTERN DISTRICT
MANITOBA
FOREST INSECT AND DISEASE SURVEY- WINNIPEG
FIG. 10
LARGE ASPEN TORTRIX INFESTATION
1956
MODERATE - SEVERE
LIGHT
COLLECTION POINTS OUTSIDE
MAIN INFESTATION AREA
MODERATE
LIGHT
LAKE
WINNIPEG
BERENS R.
GYPSUMVILLE
SASAGINNIGAK L.
LAKE
WINNIPEGOSIS
ASHERN
HODGSON
AIKENS L.
RIVERTON
LAC DU BONNET
BEAUSEJOUR
WINNIPEG
RENNIE
Scale
0
35

to occur in 1957. The results of these counts, one at Dolly Bay (sec. 35, tp. 24, rge. 7, W.P. mer.) and the other at Pebble Beach (sec. 11, tp. 23, rge. 8, W.P. mer.), were eleven egg masses from a measured foliage area of 240 square inches, and eighteen egg masses from 360 square inches. There was some evidence of refoliation in the severely defoliated areas examined, especially in the vicinity of Dog Lake. Increased populations together with more widespread distribution of this species is expected in 1957.

3.3.6 Midge on Jack Pine, Retinodiplosis sp.

Collections taken from jack pine from 1945 to 1947 indicated the presence of a species Retinodiplosis in the Milner Ridge and Pointe du Bois areas. This insect was also taken from jack pine in the vicinity of Gypsumville and was not encountered again until 1956 when a very small but moderate infestation was found about two miles north of Stead. For further study of this insect, a tenth acre plot was established in the area, and whithin which 4,823 new shoots were examined from four 3-inch d.b.h. jack pine trees. Seven per cent of the total new shoots examined were infested by the midge. Reproduction in the immediate areas was also lightly infested. Figure 11 shows the empty pupal case of this insect after emergence, and Figure 12 shows the larvae feeding within a small patch of pitch.

3.3.7 Pine Tortoise Scale, Toumeyella numismaticum (Pettit & McD.).

A noticeable increase in the abundance and distribution of this scale occurred in most areas where it was detected in 1955. In the interlake region newly infested jack pine in the 2" d.b.h. class were common in the vicinity of Rosenburg, Fairford, St. Martin and south of Lake St. George. Specimens were also taken from mature jack pine at Fairford in sec. 13, tp. 31, rge. 10, W.P. mer. A trace of tree mortality caused by the pine tortoise scale occurred in the old infestations at Stead and Rosenburg. Elsewhere in the district only a trace of this scale was detected, and it was usually present on only one or two trees.

3.3.8 Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.).

Populations of the yellow-headed spruce sawfly remained about the same as in 1955. No serious defoliation was recorded in any part of the district. Most of the collections were taken from open growing white spruce in the forested regions and from white spruce shelterbelts in the agricultural areas. The areas in which this sawfly appeared to be most abundant were the Whiteshell Forest Reserve in the vicinity of Dorothy Lake and in scattered white spruce stands south of Fraserwood.

3.3.9 Green-headed Spruce Sawfly, Pikonema dimmockii (Cress.).

The green-headed spruce sawfly was found closely associated with the yellow-headed spruce sawfly. It was generally distributed throughout the district and it was taken in small numbers from most white and black spruce examined. Defoliation in all instances was negligible.

Fig.11

Emerged Pupal Case of Retinodeplosis sp. Attached to Pitch Nodule on Jack Pine Twig. Stead, Man.
Photograph by W.A. Reeks.
Negative Number W-456

Fig.12

Small Pitch Nodules on Jack Pine Twig Caused by Retinodiplosis sp.
Photograph by B. McLeod.
Negative Number W-484

3.3.10 Red-headed Jack-pine Sawfly, Neodiprion possibily virginiana

One collection containing fifty-nine larvae of this species was taken from jack pine at Artery Lake east of Lake Winnipeg. Light defoliation was noted on the branch from which the larvae were collected.

3.3.11 Pitch Nodule Maker, Petrova albicapitana (Busck.).

This insect was generally distributed throughout the district, being more abundant on young jack pine, but was causing no appreciable damage.

3.3.12 Boxelder Twig Borer, Proteoteras willingana (Kearf.).

Surveys in the interlake region showed that this insect was present in small numbers on most Manitoba maple examined. Similar conditions were noted in farm shelterbelts between Whitemouth and Ladywood but no serious damage has occurred to date.

3.3.13 Black-headed Budworm, Acleris variana (Fern.).

Populations of this budworm remained very low throughout the district. Only a few larvae were taken from white and black spruce. Defoliation in all instances was negligible.

3.3.14 Forest Tent Caterpillar, Malacosoma disstria Hbn.

In 1956 one larva of this insect was taken from birch at Beaver Creek tower site in the interlake region.

3.3.15 Aspen Blotch Miner, Lithocolletis salicifoliella Chamb.

Populations of this insect in the eastern district were generally low in 1956. Light but local infestations were observed in the interlake region and along the Bear River road east of Pine Falls. Elsewhere in the district only the occasional collection was made from aspen.

3.3.16 Ugly Nest Tortrix, Archips cerasivorana (Fitch.).

The distribution and occurrence of this insect remained about the same throughout the district as in 1955. It was common on roadside shrubs in the west section of the interlake region in the vicinity of Dog Lake and Vogar. Eighteen nests were counted along 1 1/2 miles of road allowances. No serious damage has been recorded to date.

3.3.17 Red-humped Caterpillar, Schizura concinna A. & S.

Several collections of this insect were made from trembling aspen in the district. Populations in the Milner Ridge area were relatively high but feeding damage was light and usually confined to one or two branches of the tree.

3.3.18 Birch Sawfly, Arge pectoralis (Leach.).

Surveys and observations of birch revealed very low populations of this insect. Two collections containing several larvae were taken from birch in sec. 30, tp. 29, rge. 1, E.P. mer. north of Hodgson. Another sample was made at Family Lake east of Lake Winnipeg.

3.3.19 White-pine Weevil, Pissodes strobi (Peck.).

There was little or no change in the status of this insect throughout the district in 1956. Occasional dead leaders on regeneration jack pine and black and white spruce occurred in the interlake and Whiteshell regions. Lightly infested trees were recorded at Manigotagan Lake, Hodgson, Powerview and Lac du Bonnet.

3.3.20 Balsam Gall Midge, Itonida balsamicola (Lint.).

The balsam gall midge occurred on most balsam examined and populations appeared to be relatively high in most areas. Several of the fifteen collection points, where one or more young and mature balsam were light to moderately infested were in the vicinity of Pointe du Bois, Eaglenest Lake, Bird River Road, Beaver Creek, Caddy Lake and Lamprey Falls.

3.3.21 Fall Cankerworm, Alsophila pometaria (Harr.).

Manitoba maple in farm shelterbelts in the Rosenburg and Arborg areas suffered moderate to severe defoliation by this insect. A lesser degree of defoliation occurred in the agricultural areas surrounding Beausejour, Stead and Whitemoth. Completely defoliated maple trees had refoliated by mid July.

3.3.22 Spruce Foliageworm, Dioryctria reniculella (Grt.).

Populations of this insect were generally low throughout the district. The occasional larva was taken from white spruce and it was usually associated with the spruce budworm. Defoliation caused by this insect was negligible.

3.3.23 Larch Casebearer, Coleophora larciella (Hbn.).

An extensive survey for this insect was conducted in all accessible tamarack stands from West Hawk Lake in the Whiteshell Forest Reserve to the Black River north of Pine Falls, but no sign of this insect was found. All branch samples used in larch sawfly population counts were critically examined for casebearer.

3.3.24 Insects Attacking Black Spruce Tops and Cones

Examination of heavily coned tops of black spruce revealed a complex of species. There was some evidence of injury to the cones and a trace of defoliation. The following are some of the insect species taken from the black spruce tops sampled at widely distributed points in the district:

The leaf roller, Herculia thymetusalis
The owlet moth, Epizeuxis aemula
The leaf roller, Archips alberta
The snout moth, Dioryctria abietella
A leaf roller, Tortricid sp.

3.3.25 Pine Needle Scale, Phenacaspis pinifoliae

A light infection of the pine needle scale occurred on jack pine in the Stead and Belair areas. It was also present on jack pine in the vicinity of McArthur Falls. Elsewhere in the district only the occasional tree was affected.

3.3.26 Other Noteworthy Insects

Other insect species, which occurred commonly through the district but caused no appreciable damage are listed below:

Insect Species	No. of Collections	Remarks and Host
Acrobasis betulella	3	Populations low
Adelges abietis	7	Common on black and white spruce, interlake region
Chrysomela tremulae	3	Causing light defoliation on trembling aspen
Cimbex americana	2	Found on willow and t.aspen
Halisidota maculata	11	Common on white birch, causing no defoliation
Hemichroa crocea	5	Causing very light defoliation on alder
Hyphantria textor	15	Generally distributed throughout the district
Malacosoma pluviales	1	Populations very low
Neodiprion abietis	7	Populations very low
Neodiprion nanulus	2	Populations very low
Neodiprion pratti banksianae	1	Populations very low
Neodiprion swainei	2	Populations very low
Orthosia hibisci	4	Causing light feeding damage
Protoboarmia porcelaria	2	Populations very low
Sciaphila duplex	4	The occasional larvae on trembling aspen
Semiothisa bicolorata	3	Populations low
Semiothisa granitata	4	Populations low
Semiothisa sexmaculata	3	Populations very low
Tetralopha robustella	7	Found on jack pine throughout the Whiteshell F. R.
Xylomyges dolosa	6	Common on trembling aspen
Zale duplicata	3	Populations very low

3.4 TREE DISEASE CONDITIONS

3.4.1 Mistletoe on Jack Pine, Arceuthobium americanum.

For the second year, intensive surveys were conducted in all accessible jack pine stands in the Whiteshell Forest Reserve and in the areas east and west of Bissett for the occurrence of A.americanum, but no trace of this disease was found. There was no change in the distribution and intensity of the old infested areas at Belair and Victoria Beach.

3.4.2 Dwarf Mistletoe on Black Spruce, Arceuthobium pusillum.

Surveys in 1956, indicated little or no change in the distribution and occurrence of this mistletoe in black spruce stands throughout the district. The occasional dead black spruce, supporting one or more brooms, was observed in the infested areas north and south of Beaver Creek and in the Gypsumville and Grand Beach areas.

3.4.3 Hypoxylon Canker of Poplar, Hypoxylon pruinatum.

This canker of trembling aspen is generally distributed throughout the district. No new infections were encountered during the survey. Dead tops caused by complete girdling by the cankers were most conspicuous in the agricultural areas of the district.

3.4.4 Ink Spot on Poplar, Ciborina bifrons.

A light infection of this fungus occurred in small patches of trembling aspen west of Rennie. Collections were also taken from trembling aspen in the vicinity of Eaglenest Lake and Pointe du Bois. In the interlake region, only the occasional tree was affected. In all instances, less than twenty-five per cent of the foliage was affected.

3.4.5 Red Ring Rot, Fomes pini.

Two collections of this fungus were made during the survey. One was taken from a mature jack pine along the Bear River road and the other collection was taken from black spruce west of Pointe du Bois. In each instance infection was observed in only one tree.

3.4.7 Hail Injury.

Severe hail injury to balsam fir and jack pine was observed at several points in the eastern section of the district. At Wanipigow Lake, approximately fifty per cent of the balsam fir branches were dead over an area of about 400 acres. Similar injury occurred to jack pine in the immediate vicinity of the Pointe du Bois tower site. In the Whiteshell Forest Reserve, three areas of severe injury occurred in stands of jack pine regeneration. These stands were located at Eaglenest Lake, Big Whiteshell Lake and 6 miles east of Pointe du Bois along the Winnipeg River. Injury to hardwoods in these same areas was not severe enough to cause the death of the branches. Reports from residents indicate that most of the hail storms in the district occurred from late July to early August.

Fig.13

Dwarf Mistletoe Broom on Black Spruce
Caused by Arceuthobium pusillum.
Beaver Creek, Man.
Photograph by K. Mortenson.
Negative Number W-482

3.5 SPECIAL COLLECTIONS

A number of special collections were made during the season for various project workers at the Winnipeg and other laboratories. The different types of collections are shown in the following table.

Table 7.

Summary of Special Collections

Type of collection and for whom	No. of Collections	Time spent collecting (including travel)
Larch sawfly cocoon collections for parasite and disease study, Winnipeg Laboratory F.I.S.	8 (100 cocoons ea.)	4 days
Larch sawfly cocoon collections, J. Muldrew, Winnipeg Laboratory	6 (100 cocoons ea.)	3 days
Larch sawfly cocoon collections, R. J. Heron, Winnipeg Laboratory	1200 cocoons	4 days
Larch sawfly larval collections, H.R. Wong, Winnipeg Laboratory	500 larvae 1st, 2nd and 4th instars	3 days
Jack-pine budworm larval collection, R. J. Heron, Winnipeg Laboratory	400 larvae	1 day
Jack-pine budworm larval collection, Dr. Stehr, Sault Ste. Marie, Ontario	1000 larvae	2 days
Aphid Collections, G. A. Bradley, Winnipeg Lab.	6 collections	3 days

3.6 SPECIAL PROJECTS

3.6.1 Phenological Survey.

Early in the 1956 season five areas were selected in the district to measure phenological events, especially shoot length. In the areas selected, the new shoots of five trees from four different tree species were tagged and measured in mm. in late June. Measurements were taken again in early September after all shoot growth was completed. The majority of the tagged trees selected were the open growing type and ranged in height from four to twelve feet. Table 8 shows the location of the stations and the different tree species, in addition, the results of the measurements in mm. are also shown.

Table 8.

Location of Stations from which
Phenological Measurements were taken in 1956.
Eastern District of Manitoba

Station No.	Tree species	Location					Average length per shoot of 5 trees - results of measurements			
		Place	Sec.	Tp.	Rge.	Mer.	Date	mm.	Date	mm.
1	wS	Beaver Creek	13	28	4	EP	20/6	72	11/8	95
	tA	" "	13	28	4	EP	20/6	34	11/8	84
	tL	" "	28	26	4	EP	20/6	13	11/8	33
	jP	Rosenburg	1	25	2	EP	20/6	80	11/8	85
2	wS	Hodgson	6	25	1	WP	25/6	74	12/8	79
	tA	"	6	25	1	WP	25/6	67	12/8	75
	tL	Red Rose	3	29	1	WP	26/6	47	12/8	158
	jP	" "	24	29	1	WP	26/6	157	12/8	161
3	wS	St. Martins	13	31	10	WP	27/6	91	14/8	144
	tA	" "	13	31	10	WP	27/6	48	14/8	75
	tL	" "	13	31	10	WP	27/6	58	14/8	143
	jP	" "	23	31	11	WP	27/6	133	14/8	137
4	wS	Pointe du Bois	11	16	13	EP	14/6	82	6/9	164
	tA	" " "	11	16	13	EP	14/6	55	6/9	67
	tL	" " "	25	15	11	EP	14/6	14	14/9	52
	jP	" " "	11	16	13	EP	14/6	89	6/9	127
5	wS	Black River Rd.	11	20	10	EP	15/6	50	17/10	62
	tA	" " "	11	20	10	EP	15/6	40	17/10	96
	tL	" " "	11	20	10	EP	15/6	13	17/10	101
	jP	" " "	11	20	10	EP	15/6	163	17/10	215

3.6.2 Foliage Production Records of Tamarack.

Foliage production records were taken on tagged tamarack trees in all permanent sample plots. On individual trees, defoliation was recorded for each crown level, i.e. lower, mid and upper crowns. This procedure was followed in arriving at the average percentage of branch mortality per tree. Cone production was generally light on most tagged trees examined.

Infestation ratings by sequential sampling in terms of light, moderate and severe was conducted at all permanent sample plots and the information obtained from these methods are summarized in the following table.

3.7 SUMMARY OF INSECT AND TREE DISEASE COLLECTIONS

The following is a summary of all insect and tree disease collections made in the Eastern District of Manitoba in 1956.

Table 10.

Summary of Insect and Tree Disease Collections - 1956.

Host	No. of Insect Collections	No. of Disease Collections
Jack pine	45	2
White spruce	36	
Black spruce	12	1
Balsam fir	55	
Tamarack	25	
Trembling aspen	53	2
Balsam poplar	4	
White birch	34	
Alder	9	
Oak	5	
Chokecherry	3	
Willow	14	
Manitoba maple	5	
Dogwood	1	
Pincherry	2	
Mountain ash	1	
Miscellaneous	21	

3.8 PERSONNEL CONTACTED

Contacts were made periodically during the surveys to acquaint Forest Service personnel and private woods operators with forest insect and tree disease conditions throughout the district; and to obtain assistance for surveying inaccessible areas.

Name	Position	Address	No. of Contacts
C. Ritchie	Chief Ranger	Rennie	2
W. Danyluk	Forest Engineer	"	4
B. Vermilyea	District Forester	Winnipeg	4
B. Emes	Forest Ranger	Seven Sisters	3
D. Wardrop	Senior Ranger	Lac du Bonnet	6
J. McCarrol	Forest Ranger	" " "	4
J. Nespor	Chief Ranger	" " "	6
H. Smith	Pilot	" " "	2
F. Hanton	Pilot	" " "	2
L. Goudrey	Pilot	" " "	2
J. Inkster	Forest Ranger	Pine Falls	3
W. Ruth	Forest Ranger	Stead	5
A. Majure	Forest Ranger	Riverton	4
H. Clee	Forest Ranger	Ashern	3
A. Jardine	Forester	Lac du Bonnet	2
C. Hall	Forester	Pine Falls	1
G. Bailey	Cruiser	Pine Falls	2
J. Russell	Fire Ranger	Bissett	4
B. Davies	Fire Ranger	Sasaginnigak	1
N. Wier	Fire Ranger	Beaver Creek	4
M. McKinnon	Senior Ranger	Winnipeg	3
J. MacDonald	Chief Ranger	Sault Ste. Marie	1
E. Buchan	F. B. R.	Sault Ste. Marie	2
J. McPhee	F. B. R.	Sault Ste. Marie	1

4. ANNUAL REPORT OF FOREST BIOLOGY RANGER SOUTHERN DISTRICT OF SASKATCHEWAN

1956

by

K. L. Mortensen

INTERIM REPORT - 1956

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

February, 1957

4.1 INTRODUCTION

Field surveys of tree insects and diseases were carried out in the Southern District of Saskatchewan from May 30 to September 11, 1956. The period from September 12 to September 28 was spent assisting Ranger A. E. Campbell in the Eastern District of Manitoba.

The greater part of the work consisted of general sampling. Special collections of aphids, mass collections of larch sawfly cocoons, boxelder twig borer populations counts and shelterbelt mortality counts were made. An additional eight permanent sampling stations were also established.

A total of 294 insect sample was submitted to the Winnipeg laboratory. Six tree disease samples were collected and sent to the Forest Pathology Laboratory, Saskatoon, Saskatchewan.

A one-half ton panel truck previously used was replaced by a sedan delivery, which greatly facilitated coverage of the district.

Trailer accommodations throughout the season were located at Moose Jaw, Swift Current, Maple Creek, Yorkton and Indian Head.

4.2 REVIEW OF FOREST INSECT AND TREE DISEASES

The most noticeable change in insect conditions was the build up of large aspen tortrix populations and the resulting widespread defoliation of trembling aspen over much of the aspen-grove section of the Southern District of Saskatchewan.

The gray willow-leaf beetle caused severe skeletonization of willow throughout much of the park-belt portion of the district.

In a few shelterbelts and at one location in the Cypress Hills Provincial Forest an increase in populations of the spruce budworm was evident.

The status of the fall cankerworm and yellow-headed spruce sawfly, two serious defoliators of deciduous and spruce shelterbelts, remained much the same as in previous years.

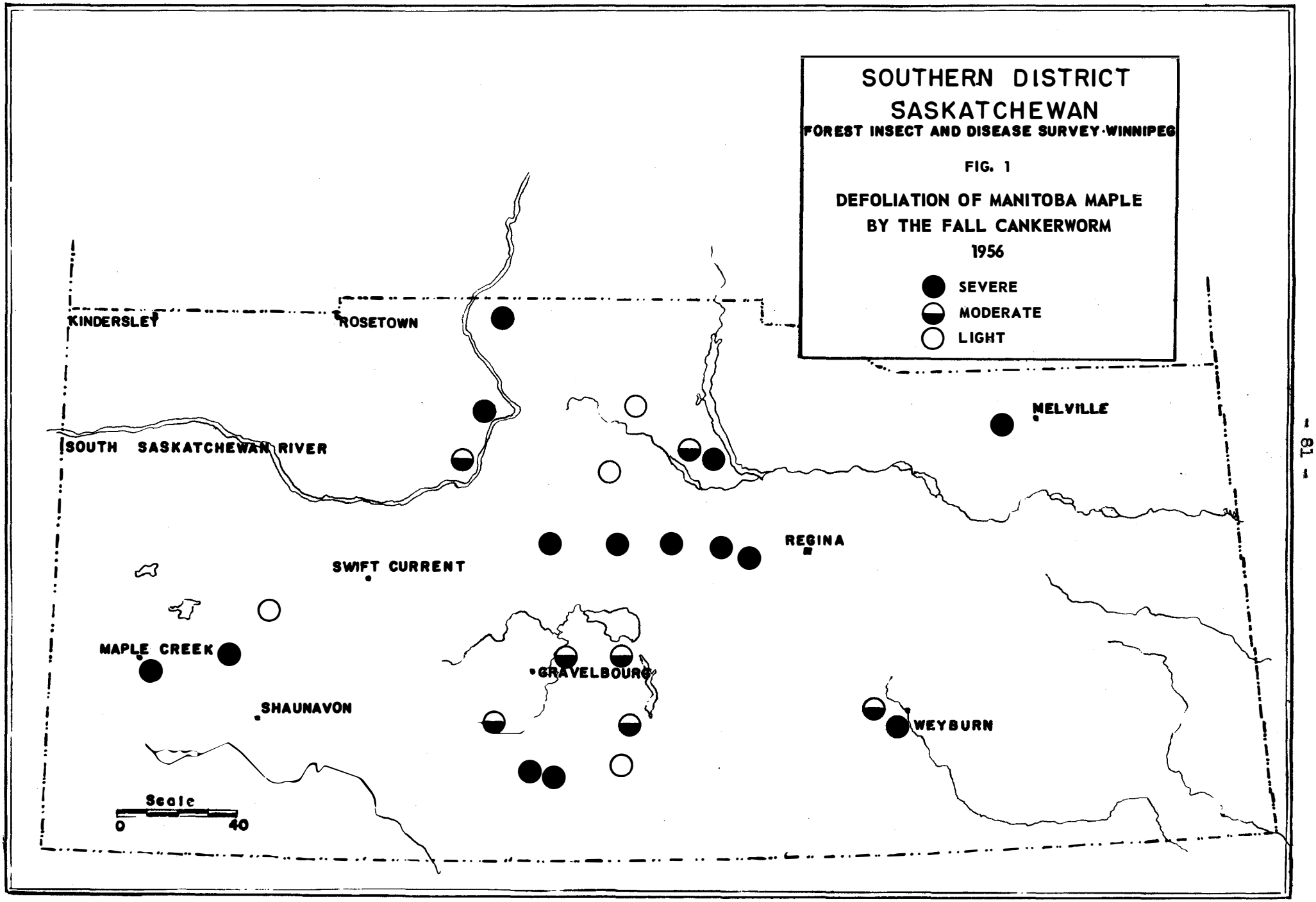
Very light populations of the forest tent caterpillar occurred in the widely scattered stands of trembling aspen in the south and southwestern portion of the district.

4.3 INSECT CONDITIONS

4.3.1 Fall Cankerworm, Alsophila pometaria (Harr.).

Many shelterbelts of Manitoba maple, elm and ash again suffered considerable defoliation from the fall cankerworm. Various shelterbelts from Melville westward were moderately to severely attacked (Figure 1).

In some instances noticeable declines in populations were evident, while other shelterbelts only a few miles removed would contain a new and heavy infestation. One such example occurred at Findlater where a 4-year old


SOUTHERN DISTRICT
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY-WINNIPEG
FIG. 1
DEFOLIATION OF MANITOBA MAPLE
BY THE FALL CANKERWORM
1956
SEVERE
MODERATE
LIGHT
KINDERSLEY
ROSETOWN
SOUTH SASKATCHEWAN RIVER
MELVILLE
REGINA
SWIFT CURRENT
MAPLE CREEK
GRAVELBOURG
SHAUNAVON
WEYBURN
Scale
0
40

infestation showed a marked decline, while a one-half mile row of Manitoba maple and ash on the adjoining quarter-section showed a considerable increase in populations of the fall cankerworm. A number of infestations have persisted for the past 3 years in the south central area of the district around Fir Mountain, Mankota and Gravelbourg. Defoliation of roadside plantings near Broderick has been severe for the past 4 years. The fall cankerworm also caused almost completed defoliation in River Park in the city of Moose Jaw. A number of defoliated shelterbelts could be noticed along No. 1 highway from Moose Jaw to Swift Current and again west of Maple Creek. Declines in the fall cankerworm population were recorded in shelterbelts at Eyebrow, Girvin and Yellow Grass.

Manitoba maple was the most commonly attacked tree. The warm, dry spring appeared favourable to rapid insect development. Second instar larvae were common in the field by June 1 and pupation was nearly complete by July 1. These dates are similar to 1955.

The frequency of occurrence of cankerworm by host tree samples is shown in Table 1.

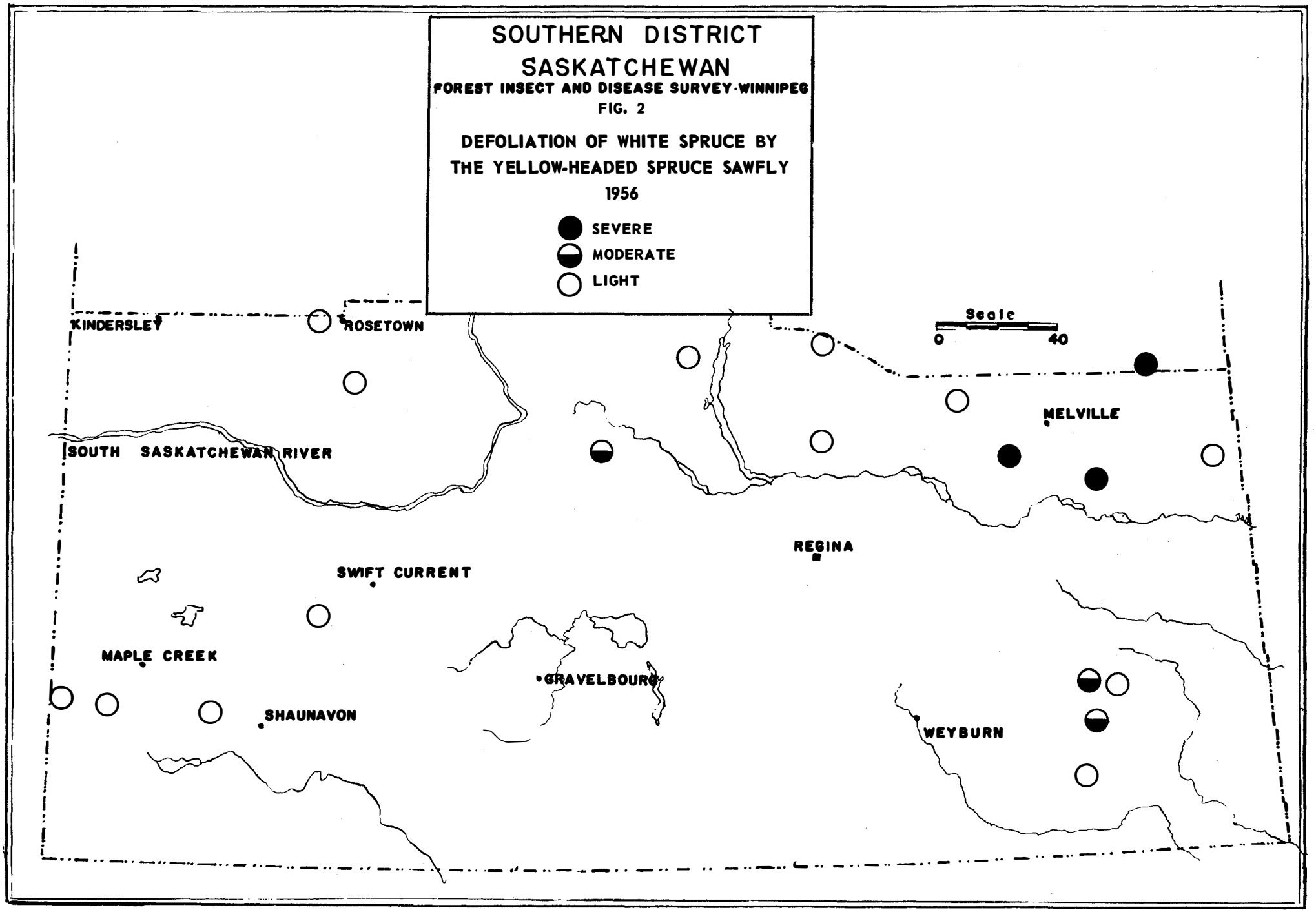
Table 1.

Summary of the Occurrence of the Fall Cankerworm

Host	No. of Collections	Percentage Containing Cankerworm
Manitoba maple	67	31.3
Ash	12	33.3
Elm	4	50.0
Golden willow	4	50.0

4.3.2 Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.).

The distribution and intensity of the yellow-headed spruce sawfly in the Southern District of Saskatchewan remained much the same as in previous years. An occasional larva was found on native white spruce in the Cypress Hills and in a shelterbelt south of Swift Current in the southwest corner of the Province. In the Rosetown - Elrose area, light populations still persisted in shelterbelts that had been sprayed in 1955. Larvae were numerous in a large white spruce planting near Eyebrow, causing light to moderate defoliation. This location marks the most southerly point where the yellow-headed spruce sawfly was found in the central part of the district. In the aspen-grove section in the eastern part of the district, larvae were common in many white spruce shelterbelts (Figure 2). However, most shelterbelts examined in this area showed only light defoliation. Ornamental white spruce in the cemetery at Dubuc have been severely defoliated for the past 2 years. A number of white spruce plantings around private cottages at Kenosee Lake also suffered moderate to heavy defoliation. At Kenosee Lake Resort spray operations were carried out by many cottage owners in co-operation with the Saskatchewan Department of Natural Resources.


SOUTHERN DISTRICT
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY-WINNIPEG
FIG. 2
DEFOLIATION OF WHITE SPRUCE BY
THE YELLOW-HEADED SPRUCE SAWFLY
1956
SEVERE
MODERATE
LIGHT
Scale
0
40
KINDERSLEY
ROSETOWN
SOUTH SASKATCHEWAN RIVER
MELVILLE
REGINA
SWIFT CURRENT
MAPLE CREEK
GRAVELBOURG
SHAUNAVON
WEYBURN

First instar larvae were found on June 25 at Carlyle, while the last larval collection was made July 21 at Rosetown.

The frequency of occurrence of yellow-headed spruce sawfly in samples taken from white spruce is shown in Table 2.

Table 2.

Summary of Occurrence of the Yellow-headed Spruce Sawfly

Host	No. of Collections	Percentage Containing Yellow-headed Sawfly
White spruce	52	26.9

4.3.3 Large Aspen Tortrix, Choristoneura conflictana (Wlkr.).

The large aspen tortrix showed a marked increase in 1956 throughout the aspen-grove section of the Southern District of Saskatchewan. In the Beaver Hills, north of Balcarris, trembling aspen over an area of approximately 800 square miles was from 25 to 75 per cent defoliated. Small pockets of severe defoliation were recorded in the Fort Qu'Appelle, Broadview and Moose Mountain areas (Figure 3).

Larvae were common in the field the last week in May and pupation was nearly complete by the end of June. Defoliation was noticeable from mid June onward, as the aspen did not fully refoliate during the reaminder of the summer. During the last week in June moth flights and egg laying were observed in the infestation and surrounding areas and indications are that a further extension of this outbreak may occur in 1957.

The frequency of occurrence of the large aspen tortrix in trembling aspen samples is shown in Table 3.

Table 3.

Summary of Occurrence of the Large Aspen Tortrix

Host	No. of Collections	Percentage containing large aspen tortrix
Trembling aspen	79	24

4.3.4 Spruce Spider Mite, Paratetranychus ununguis (Jac.).

The warm, dry summer appeared to favour the increase of this spruce shelterbelt pest in the Southern District of Saskatchewan. Shelterbelts that had been sprayed with DDT for the control of the yellow-headed spruce sawfly

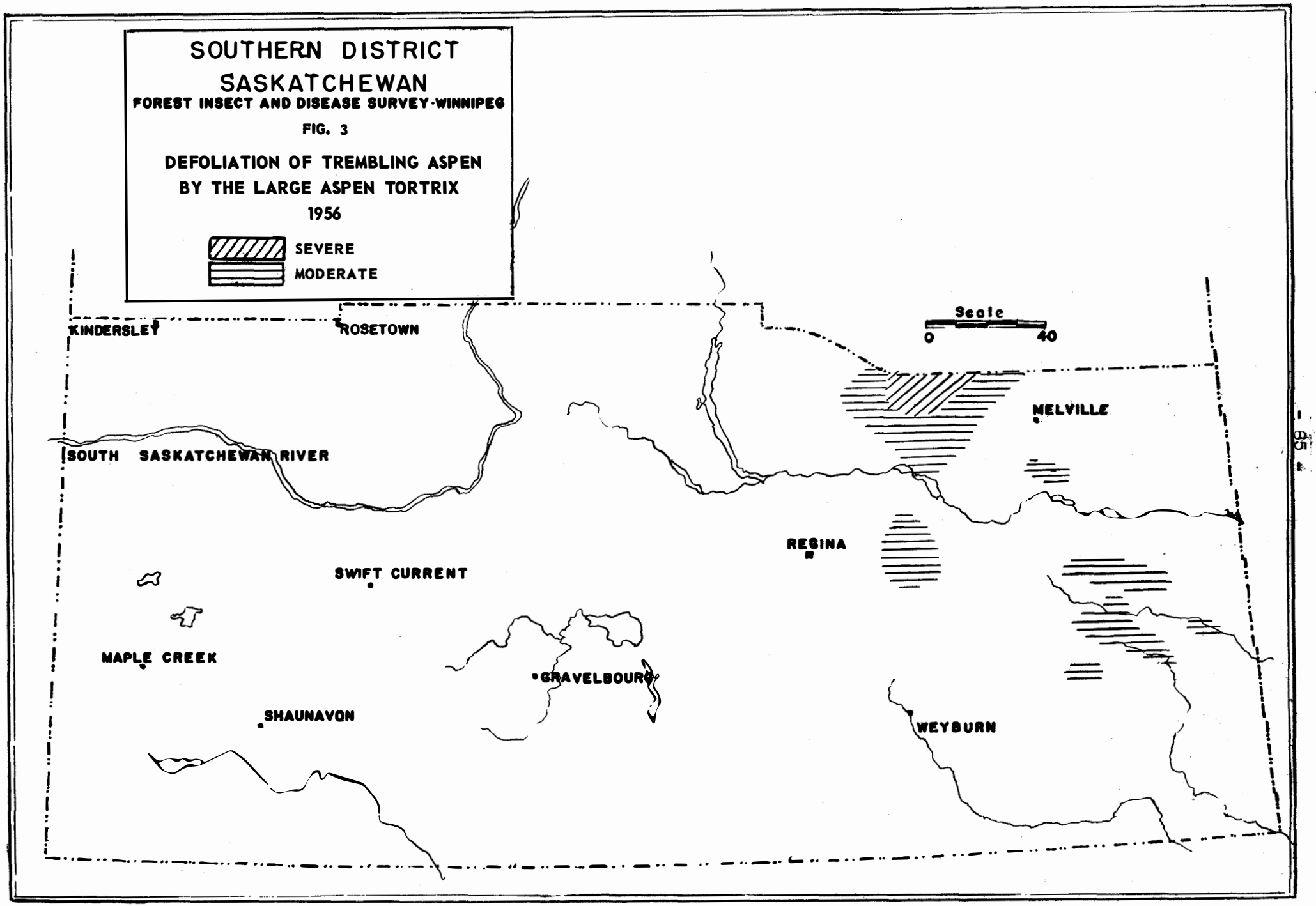

SOUTHERN DISTRICT
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY-WINNIPEG
FIG. 3
DEFOLIATION OF TREMBLING ASPEN
BY THE LARGE ASPEN TORTRIX
1956
SEVERE
MODERATE
Scale
0
40
KINDERSLEY
ROSETOWN
MELVILLE
SOUTH SASKATCHEWAN RIVER
REGINA
SWIFT CURRENT
MAPLE CREEK
GRAVELBOURG
SHAUNAVON
WEYBURN

Fig.4

Fig.5

Figs.4 and 5. Trembling Aspen Defoliated by Choristoneura conflictana.
Ft. Qu'Appelle, Sask.
Photographs by K. Mortenson.
Negative Numbers W-479
W-480

showed marked increases in mite populations. Heavy infestations were again noted in the ornamental white spruce in the town of Maple Creek and in the Neville Cemetery. Shelterbelts at Hughton and Rosetown contained higher numbers of mites than last year. Although mites were numerous here, damage to foliage was not considered serious.

The frequency of occurrence of the spruce spider mite in white spruce samples is shown in Table 4.

Table 4.

Host	No. of Collections	Percentage Containing Mites
White spruce	52	25

4.3.5 Boxelder Leaf Roller, Gracillaria prob. negundella Cham.

The boxelder leaf roller was abundant throughout the Manitoba maple shelterbelts in the Southern District of Saskatchewan. Larvae were found at Ardill, Carlyle, Maple Creek, Yorkton and Findlater but no appreciable amount of defoliation was noted. Larvae and pupae were collected during the months of June, July and August.

The frequency of occurrence of the boxelder leaf roller by host tree samples is shown in Table 5.

Table 5.

Host	No. of Collections	Percentage Containing Leaf Roller
Manitoba maple	67	40.3

4.3.6 Pine Needle Scale, Phenacaspis pinifoliae (Fitch.).

The pine needle scale was scattered throughout the entire Southern District of Saskatchewan. Populations increased slightly during the summer. Heavy infestations were usually confined to a few trees in any one planting. This situation was noted at Indian Head, Grenfell, Neville and Yellow Grass. Scale populations declined on the native white spruce and lodgepole pine in the Cypress Hills Provincial Forest.

The frequency of occurrence of pine needle scale by host tree samples is shown in Table 6.

Table 6.

Host	No. of Collections	Percentage Containing Scale
White spruce	52	17.3

4.3.7 Larch Sawfly, Pristiphora erichsonii (Htg.).

Only three tamarack plantations have thus far been encountered in the Southern District of Saskatchewan. Defoliation was heavy in all three areas in 1956.

Population sampling at the Wolseley plot indicated that 35 per cent of current shoots on tamarack had been utilized for oviposition. The infestation rating for this area was severe.

At the Battle Creek Ranger Station, in the west block of the Cypress Hills Provincial Forest, larch sawfly populations remained high on the few planted tamarack.

At the Forest Nursery Station, Indian Head, mature Siberian and European larches were again heavily defoliated.

Cocoons were collected on August 31 from Indian Head and Wolseley for parasitism studies. Differences in percentage parasitism of larch sawfly larvae were obtained in the two plots at Indian Head and the one at Wolseley. Tritneptis klugii, which is usually considered an ineffective parasite of larch sawfly, caused almost 95 per cent mortality of cocoons at one collection point on the Forest Nursery Station, Indian Head (Figures 6, 7).

The results of the cocoons dissections are shown in Table 7.

Fig.6

Tritneptis klugii Larvae Attacking Pristiphora erichsonii Larva in Cocoon.
Photographs by B. McLeod.
Negative Number W-229

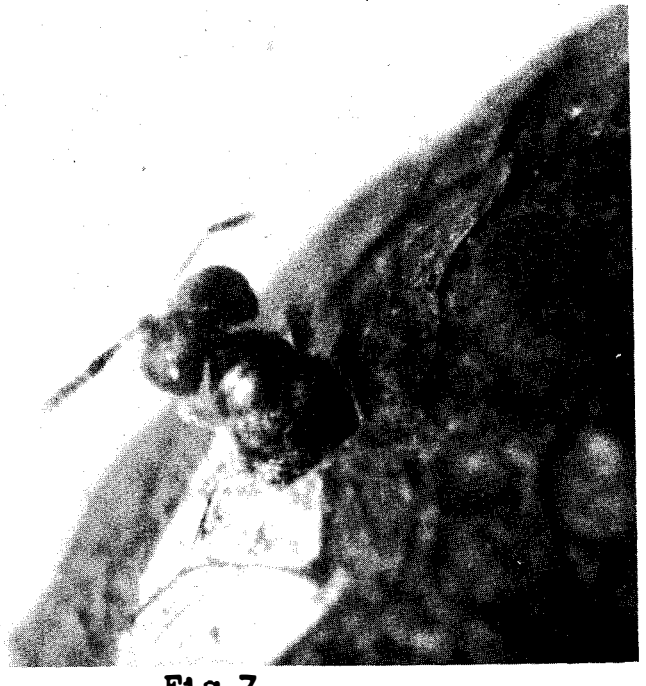


Fig.7

Tritneptis klugii Adult Emerging From Pristiphora erichsonii Cocoon.
Negative Number W-230

Table 7.

Summary of Larch Sawfly Parasitism Determined by Dissections

Place	No. of cocoons examined	No. of larch sawfly containing Mesoleius		Percentage effective parasitism based on living larvae			Percentage cocoons diseased
		Eggs	Larvae	Bessa harveyi	Mesoleius tenthredinis	Tritneptis klugii	
1*	75	0	0	0	0	94.34	25.33
2**	150	5	1	23.02	0.79	8.73	11.33
3***	200	36	8	7.91	3.96	0.0	4.50

* Forest Nursery Plot # 1, Indian Head
** Forest Nursery Plot # 2, Indian Head
*** Wolseley

4.3.8 Forest Tent Caterpillar, Malacosoma disstria Hbn.

In the Southern District of Saskatchewan the forest tent caterpillar increased slightly in 1956, but populations were still very low.

Distribution was confined to the isolated stands of native aspen and elm occurring on the higher elevations of the southern part of the district. Larvae were collected along the Moose Jaw Creek at Trossachs, from the Pasquia Hills, the Wood Mountain and in the Cypress Hills. As the wooded areas were generally small no survey was made to determine the distribution within the stands. These areas will be surveyed more intensively in 1957 to check for further increases in populations of this species.

A summary of forest tent caterpillar collections is shown in Table 8.

Table 8.

Summary of Forest Tent Caterpillar Collections
Southern District of Saskatchewan - 1956

Place	Location				Host	No. of larvae	No. of pupae	No. of Egg Clusters
	Sec.	Tp.	Rge.	Mer.				
Wood Mountain	29	4	3	W3	tA	3	2	-
Trossachs	23	8	17	W2	E	2	-	-
Claybank	27	12	25	W2	tA	2	-	-
Cypress Hills Park	25	8	27	W3	lP	-	1	-
Cypress Hills-East Block	21	9	25	W3	bPo	-	2	-
" " " "	21	9	25	W3	tA	-	1	-
" " West Block	5	8	29	W3	tA	-	1	-
Piapot	17	10	23	W3	W	-	1	-
Cypress Hills-East Block	30	9	23	W3	tA	-	3	-
Cypress Hills Park	7	9	27	W3	tA	-	1	-
Cypress Hills-East Block	17	9	24	W3	tA	-	-	1
" " " "	21	9	25	W3	tA	-	-	2
" " Park	25	8	27	W3	tA	-	-	1

4.3.9 Black-headed Budworm, Acleris variana Fern.

Seven samples of the black-headed budworm were taken from widely scattered locations. Four samples were taken from white spruce shelterbelts at Ernfold, Yellow Grass, Carlyle and Beaver Valley. The remaining samples were from native white spruce in the Cypress Hills Provincial Forest. At all locations only a trace of defoliation was noticeable.

4.3.10 Spruce Needle Worm, Dioryctria reniculella Grt.

The spruce needle worm was not common. Only 3 collections, each containing a single larva, were made in 1956.

4.3.11 Spruce Budworm, Choristoneura fumiferana (Clem.).

Moderate to heavy infestations of the spruce budworm were found at 3 locations in the Southern District of Saskatchewan.

In a white spruce shelterbelt at Grenfell, populations of the spruce budworm and yellow-headed spruce sawfly caused approximately 90 per cent defoliation of the current foliage. The spruce budworm was responsible for moderate defoliation to a Colorado spruce plantation on the Forest Nursery Station, Indian Head. Evidence of considerable back feeding was found on these mature Colorado spruce trees.

In the Cypress Hills Provincial Forest, a small area of native white spruce along the Battle Creek (Tp. 8, Rge. 30) was subjected to moderate defoliation of the current foliage by the spruce budworm.

Collections were obtained from only one other point in the Southern District of Saskatchewan. At Ernfold a row of mature white spruce planted along side the main line of the Canadian Pacific Railway contained the occasional spruce budworm larvae. Defoliation was negligible.

4.3.12 Aphids

The caragana aphid, Macrosiphum carraganae Cholod. and the boxelder aphid, Periphyllus negundinis (Thos.) remained at low levels in 1956. The aphids on elm, Eriosoma americanum (Riley) and Eriosoma lanigerum (Hausm.) were abundant in the Moose Jaw cemetery and in a shelterbelt on a vacant farm near Assiniboia. Elsewhere they were less common than in the past three years.

4.3.13 Owlet Moth, Orthosia hibisci Gn.

This owlet moth was noticeably less abundant than in 1955. Only one sample, consisting of a single larva, was collected in the Southern District of Saskatchewan in 1956, whereas in 1955 twenty-eight collections of the owlet moth were made.

4.3.14 Green-headed Spruce Sawfly, Pikonema dimmockii (Cress.).

Four samples of the green-headed spruce sawfly were collected in the Southern District of Saskatchewan. Distribution was confined to native white spruce in the Cypress Hills Provincial Forest and a white spruce shelterbelt

southwest of Swift Current. At all collection points, the larvae were found in association with the yellow-headed spruce sawfly.

Only a few larvae were found at each sample point and defoliation was negligible.

4.3.15 Tent Caterpillar, Malacosoma lutescens (N. & D.).

The status of the tent caterpillar, M. lutescens remained much the same as in the past 3 years. Distribution was widespread, occurring wherever chokecherry, gooseberry and rose were found. Moderate populations occurred on pasture lands near Caron. Elsewhere only a few tents were observed. Collections of the tent caterpillar were made at Caron, Moose Jaw, Pickthall, Meyronne and Buffalo Pound Lake.

4.3.16 Ugly Nest Caterpillar, Archips cerasivorana Fitch.

The distribution and intensity of the ugly nest caterpillar remained about the same as in previous years. In the Great Sand Hills, large patches of chokecherry were entirely enclosed in nests. This caterpillar was also very abundant on the pasture lands southwest of Caron. Lighter infestations were recorded in the Elbow Provincial Forest and on the rangeland at Pickthall and Old Wives Lake.

4.3.17 A Webworm, Tetralopha asperatella Clem.

This webworm was much less common throughout the trembling aspen stands of the Southern District of Saskatchewan in 1956, than for the past two years. Light populations were found throughout the Cypress Hills Provincial Forest. Elsewhere only an occasional larva was found.

4.3.18 Gray Willow-leaf Beetle, Galerucella decora (Say).

The gray willow-leaf beetle was more widespread in the Southern District of Saskatchewan in 1956 than in 1955. Severe skeletonizing of willow foliage was evident throughout the aspen-grove section of the district. The area of infestation comprised a rough triangle encompassed by the Saskatchewan-Manitoba boundary, the northern boundary of the district, and a line running northwest from Moose Mountain through Indian Head to Raymore. Patches of willow within this area were 75 to 100 per cent skeletonized, while all willow examined contained some larvae and adults. Heavy infestations were recorded at Willowbrook, Duff, Calder, Waldron and in the Moose Mountain Provincial Forest. A small infestation of moderate intensity occurred in the Cypress Hills south of Piapot.

Sixteen samples of the gray willow-leaf beetle were made throughout June, July and August.

The frequency of occurrence of the gray willow-leaf beetle by host tree samples is shown in Table 9.

Table 9.

Host	No. of Collections	Percentage Containing Beetles
Trembling aspen	79	6.4
Willow	26	46.1

4.3.19 American Poplar Leaf Beetle, Phytodecta americana (Schffr.).

A small infestation of the American poplar leaf beetle causing moderate defoliation of trembling aspen was found in the East Block of the Cypress Hills Provincial Forest. A few adults were collected at Indian Head, but no damage was noted.

4.3.20 Boxelder Twig Borer, Proteoteras willingana Kearf.

The boxelder twig borer occurred on almost all Manitoba maple throughout the Southern District of Saskatchewan (Figure 8).

During the 1956 field season population sampling of this insect was carried out at a number of representative points in the district. Leaf clusters were sampled and the number of twig borers counted on four branches from each of five trees per shelterbelt. The results of these counts are shown in Table 10. The percentage of twigs infested with twig borer ranged from 8.1 to 46.1 per cent.

4.3.21 Pitch Nodule Maker, Petrova albicapitana (Busck.).

The pitch nodule maker occurred occasionally in the Southern District of Saskatchewan. Small numbers of larvae were found on lodgepole pine in the West Block of the Cypress Hills Provincial Forest, and on a small, isolated planting of lodgepole pine near Swift Current. A few nodules were also found on planted jack pine at Eyebrow. In a young jack pine plantation at the Forest Nursery Station, Indian Head, pitch nodule maker populations were very high and considerable mortality of leaders and laterals was noted on infested trees.

4.3.22 Woolly Bears.

Larvae of the Halisidota maculata were more common in 1956 than in the past 3 years. Distribution was widespread throughout the Southern District of Saskatchewan with moderate populations found at Caron, Moose Jaw, Morse, Ernfold, Gull Lake and Maple Creek. Light defoliation was caused to Manitoba maple shelterbelts at Morse and Gull Lake.

Larvae of Acronicta americana also occurred commonly, and were associated with Halisidota maculata , but were less numerous.

4.3, 23 Wood Borers and Bark Beetles.

Greater emphasis was placed on the collection of wood borers and bark beetles in 1956. Twelve samples were made and are shown in Table 11.

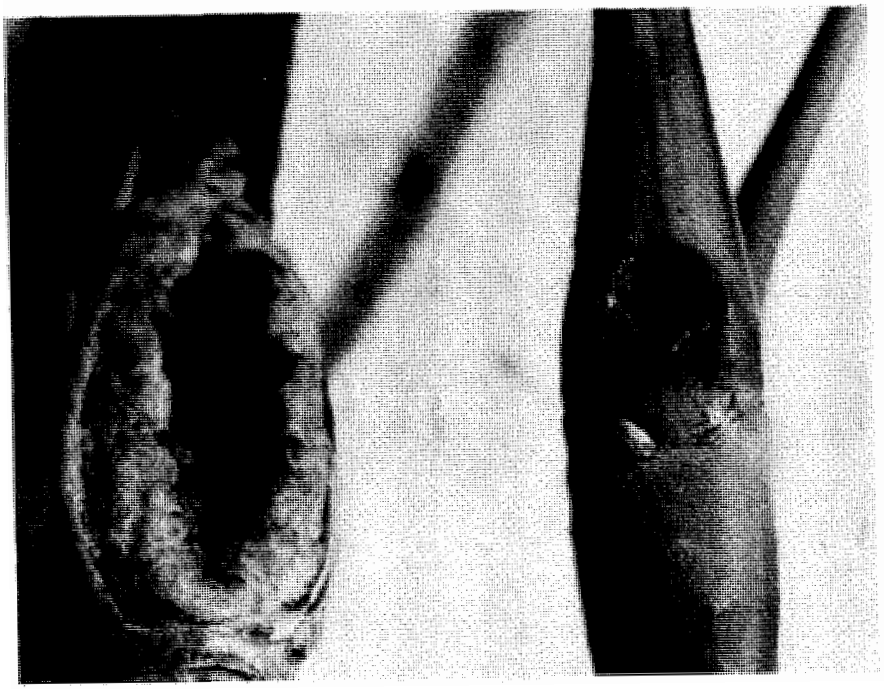


Fig.8

Old and New Damage on Manitoba Maple by *Proteoteras willingana*. Moose Jaw, Sask.

Photograph by K. Mortenson.
Negative Number W-476

Table 10.
Results of Twig Sampling of Manitoba Maple for Boxelder Twig Borer Populations
Southern District of Saskatchewan
1956

Plot No.*	Tree No.	Infestation Data								Average per cent twigs infested	
		Branch #1		Branch #2		Branch #3		Branch #4			
		No. of Twigs	No. of twigs infested	No. of Twigs	No. of twigs infested	No. of Twigs	No. of twigs infested	No. of Twigs	No. of twigs infested	Per tree	Per plot
1	1	7	1	9	5	10	6	8	7	54.1	
	2	13	6	7	2	8	1	8	2	28.0	
	3	9	2	8	2	8	0	5	0	11.7	
	4	7	7	6	3	6	5	8	7	84.4	
	5	5	2	6	5	6	3	8	3	52.5	46.1
2	1	3	1	9	2	10	3	5	2	31.3	
	2	12	1	7	0	4	1	8	0	8.3	
	3	4	0	7	0	13	1	8	0	1.9	
	4	12	2	8	1	4	0	5	0	8.2	
	5	6	1	11	1	13	3	4	0	12.1	12.3
3	1	10	4	6	1	6	1	5	0	18.3	
	2	8	3	6	0	5	2	4	2	31.8	
	3	6	1	5	3	3	0	3	1	27.5	
	4	6	2	7	0	6	5	5	2	39.1	
	5	9	3	6	1	6	1	3	1	21.9	28.3

* Plot No. 1 - Moose Jaw, S.33-15-26-W2
No. 2 - Indian Head, S.35-19-13-W2
No. 3 - Carlyle, S.31-5-2-W2

Table 10 continued

Plot No.*	Tree No.	Infestation Data: Branch #1 No. of Twigs	Branch #1 No. of twigs infested	Branch #2 No. of Twigs	Branch #2 No. of twigs infested	Branch #3 No. of Twigs	Branch #3 No. of twigs infested	Branch #4 No. of Twigs	Branch #4 No. of twigs infested	Average per cent twigs infested: Per tree	Per plot
	1	8	1	11	0	6	1	3	0	7.3	
	2	10	1	6	0	7	0	7	2	9.6	
4	3	6	1	9	1	7	0	6	0	6.9	
	4	5	1	5	0	11	1	7	1	10.8	
	5	6	0	10	1	6	1	4	0	6.7	8.3
	1	8	3	7	0	6	0	9	1	12.1	
	2	6	1	6	2	8	0	8	0	12.4	
5	3	6	0	10	1	7	1	5	0	6.0	
	4	4	0	3	0	6	1	4	1	10.4	
	5	5	0	4	0	9	2	7	1	9.1	10.0
	1	3	0	4	0	4	0	5	0	0.0	
	2	5	0	4	0	3	1	3	0	8.3	
6	3	3	0	5	1	7	1	5	0	8.5	
	4	3	0	5	1	7	2	3	0	12.1	
	5	6	0	6	1	8	3	8	1	16.6	8.1

* Plot No. 4 - Maple Creek, S.36-11-27-W3
No. 5 - Swift Current, S.6-17-13-W3
No. 6 - Ernfold, S.7-17-7-W3

Table 10 continued

Plot No.*	Tree No.	Infestation Data								Average per cent twigs infested	
		Branch #1		Branch #2		Branch #3		Branch #4			
		No. of Twigs	No. of twigs infested	No. of Twigs	No. of twigs infested	No. of Twigs	No. of twigs infested	No. of Twigs	No. of twigs infested	Per tree	Per plot
7	1	5	0	2	0	5	0	4	1	6.1	
	2	3	0	4	0	5	2	4	0	10.0	
	3	12	1	13	5	7	1	10	0	15.2	
	4	4	0	8	3	6	3	4	0	21.8	
	5	6	0	3	0	5	1	7	0	5.0	11.6
8	1	4	1	4	1	9	3	6	5	41.6	
	2	3	0	6	1	3	1	5	3	27.4	
	3	9	6	8	3	3	1	6	6	59.4	
	4	7	5	9	8	7	3	6	3	63.1	
	5	10	4	4	2	4	0	6	0	22.5	42.8
9	1	7	0	13	2	9	1	9	0	6.6	
	2	5	0	12	1	6	0	10	2	7.1	
	3	5	1	16	2	6	0	12	1	10.2	
	4	4	0	9	0	9	0	7	1	3.8	
	5	7	0	5	0	11	3	8	2	13.0	8.1

* Plot No. 7 - Willowbrook, S.4-26-6-W2
No. 8 - Findlater, S.20-21-25-W2
No. 9 - Beaver Valley P. O. - S.19-6-13-W3

Table 11.

Summary of Collections of Wood Borers and Bark Beetles

Species	Host	Degree of Infestation	Location
Buprestid sp.	T. aspen	light	Elbow Prov. Forest
Cerambycid sp.	W. spruce	light	Ernfold
Buprestid sp.	W. spruce	light	Ernfold
Dicerca sp.	T. aspen	light	Pickthall
Buprestid sp.	T. aspen	light	Buffalo Pound Lake
Clerid sp.	T. aspen	light	Buffalo Pound Lake
Curculionid sp.	W. spruce	light	Cypress Hills Prov. Forest
Scolytid sp.	W. spruce	light	Cypress Hills Prov. Forest
Cerambycid sp.	W. spruce	moderate	Fairwell Creek, Cypress Hills
Dicerca sp.	T. aspen	light	Saskatchewan Landing
Tenebrionid sp.	W. spruce	light	Cypress Hills, Six Mile Ranch
Mycetophagid sp.	L. pine	light	Cypress Hills Park

4.3.24 Other Noteworthy Insects.

The insect species listed in Table 12 occurred commonly throughout the district but caused little or no defoliation.

Table 12.

Summary of other Noteworthy Insects

Insect Species	No. of Samples	Remarks
Gelechiid sp.	27	Common on deciduous hosts
Deuteronomos magnarius	12	Common on Manitoba maple
Pandemis canadana	11	Common on M. maple and T. aspen
Olene vagans	6	Found occasionally on T. aspen
Sciaphila duplex	5	Found occasionally on T. aspen
Cecidomyia negundinis	5	Found occasionally on M. maple
Tethida cordigera	4	Found frequently on ash
Bucculatrix canadensisella	2	Occurred on alder in the Cypress Hills
Hyphantria textor	1	Nests common in sections of Qu'Appelle Valley

4.4 TREE DISEASE CONDITIONS

4.4.1 Canker of Aspen, Hypoxylon pruinatum.

Hypoxylon pruinatum occurs commonly wherever trembling aspen stands are found. The percentage of infection is highest in the aspen-grove section of the district. Tree mortality is generally light.

4.4.2 Globose Rust Gall of Lodgepole Pine, Cronartium sp.

Rust galls were common on lodgepole pine in the Cypress Hills Provincial Forest. No change in the intensity of this disease was noted.

4.4.3 False Tinder Fungus, Fomes igniarius.

Distribution and intensity of this fungus remained much the same as in previous years. It is very common on mature trembling aspen in the Moose Mountain Provincial Forest. Two samples were collected from alder and trembling aspen in the Cypress Hills Provincial Forest.

4.4.4 Yellow Witches'-Broom, Peridermium coloradense.

The yellow witches'-broom was found occasionally in the native white spruce stands of the Cypress Hills Provincial Forest.

4.4.5 The Ash Fomes, Fomes fraxinophilus.

One sample of this fungus was collected from living ash near Trossachs (Figure 9). Only a few trees appeared to be affected.

4.4.6 Conk on Manitoba maple, Pleurotus sp.

One conk of Pleurotus sp. was collected from a living Manitoba maple in a shelterbelt at Duff. Conks were observed on only two trees in the mature shelterbelt.

4.4.7 Stem Gall on Caragana.

An unidentified stem gall was collected from a caragana planting at Maple Creek (Figure 10).

4.5 SPECIAL PROJECTS

Two special projects were carried out during the 1956 field season in the Southern District of Saskatchewan. These were (a) phenological studies and (b) tree mortality in shelterbelts.

4.5.1 Phenological Studies

New growth measurements were taken on white spruce and trembling aspen at the following locations: Moose Mountain Provincial Park, Wolseley, Indian Head, Moose Jaw, Swift Current and the Cypress Hills Provincial Park. Measurements were made when growth was approximately 50% complete and again when complete. This data was then correlated to more detailed measurements taken at the Whiteshell Field Station in Manitoba.

Fig.9

Green Ash Infected by Fomes flaxinophilus. Weyburn, Sask.
Photograph by K. Mortenson
Negative Number W-477

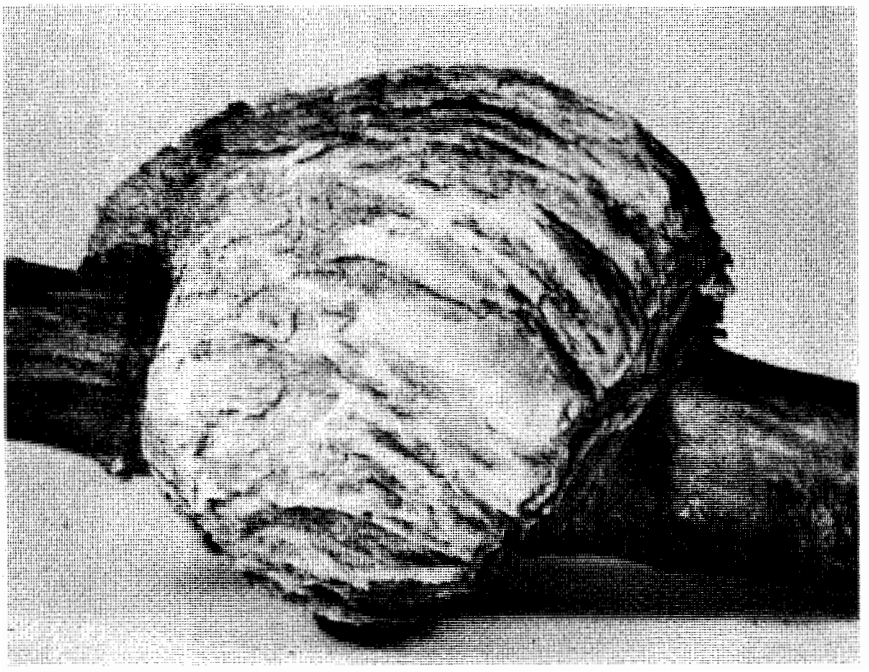


Fig.10

Gall on Caragana. Maple Creek, Sask.
Photograph by K. Mortenson.
Negative Number W-478

4.5.2 Tree Mortality in Shelterbelts.

Tree mortality counts were made on a number of shelterbelts throughout the Southern District of Saskatchewan. Percent mortality is based on a random count of approximately 100 trees in each shelterbelt. The location of shelterbelts examined is shown in Table 13.

Table 13.

Location of Shelterbelts in Which Tree Mortality Counts Were Made

Shelterbelt No.	Place	Detailed Location			
		Sec.	Twp.	Rge.	Meridian
01	Indian Head	35	19	13	W2
02	Maple Creek	7	12	26	W3
03	Beaver Valley P. O.	19	6	13	W3
04	Brancho P. O.	5	6	11	W3
05	Pambrum	24	11	12	W3
06	Wymark	25	13	15	W3
07	Ernfold	22	17	7	W3
08	Swift Current	6	17	13	W3
09	Eyebrow	17	22	1	W3
10	Eyebrow	13	21	2	W3
11	Moose Jaw	33	15	26	W2
12	Crane Valley	30	9	26	W2
13	Simpson	6	29	25	W2
14	Findlater	20	21	25	W2
15	Hart	36	2	28	W2
16	Kildeer	28	1	4	W3
17	Willowbrook	4	26	6	W2
18	Melville	27	22	8	W2
19	Melville	8	24	6	W2
20	Indian Head	35	19	13	W2

Table 14 is a summary of the tree mortality counts made throughout the Southern District of Saskatchewan in 1956.

Table 14.

Summary of Shelterbelt Tree Mortality Counts

Sta. No.	Tree species	Ave. ht.	Ave. d.b.h.	Total No. Trees	No.of dead trees	No.trees with dead leaders	No.trees with top $\frac{1}{4}$ dead	No.trees with top 1/3 dead	No.trees with top 1/2 dead
01	wS	30	4	100	0	0	0	0	0
02	mM	20	3	100	23	0	14	9	9
03	mM	15	3	100	4	0	2	0	0
04	mM	15	3	100	6	0	3	0	0
05	mM	15	2	100	44	0	17	8	0
06	wS	30	6	245	0	0	0	0	1
06	Po	30	6	128	2	0	7	6	1
07	wS	30	7	210	8	1	1	0	0
08	mM	25	4	100	3	0	1	0	0
08	gAs	25	4	100	5	0	2	0	0
09	wS	30	5	100	0	0	0	0	0
10	mM	20	4	100	19	0	8	3	3
10	gW	35	7	100	10	0	0	1	0
11	mM	15	2	100	0	0	0	0	0
12	mM	25	4	100	26	0	8	3	8
12	gAs	20	3	33	3	0	0	0	0
13	mM	20	3	100	52	0	5	5	21
13	wS	25	4	56	0	0	0	0	1
14	mM	20	4	100	10	0	1	1	2
14	gAs	10	2	50	10	0	1	0	0
15	mM	25	3	100	6	0	6	3	2
15	gAs	25	3	50	5	0	2	1	0
16	mM	20	3	100	8	0	3	1	0
17	mM	30	4	86	5	0	0	0	6
18	mM	20	3	87	5	0	0	0	14
19	mM	20	3	100	14	0	4	0	0
20	mM	20	3	100	6	0	3	0	0

Shelterbelts in which mortality counts were made range in age from 25 to 40 years. Significant tree mortality appeared to be confined to Manitoba maple shelterbelts and may be attributed partly to past infestations of the fall cankerworm. Other physical factors such as grazing and ground fires no doubt contributed to the tree mortality.

A more detailed summary of tree mortality in shelterbelt regions, in relation to past insect infestation histories, will be presented in a separate interim report from the Winnipeg Laboratory.

4.6 SUMMARY OF INSECT AND TREE DISEASE COLLECTIONS

A summary of insect and tree disease collections from the principal trees in the Southern District of Saskatchewan in 1956 is shown in Table 15.

Table 15.

Summary of Insect and Tree Disease Samples

Host Tree	Insect Sample	Disease Sample
Trembling aspen	79	1
Manitoba maple	67	1
White spruce	52	1
Willow sp.	26	
Lodgepole pine	17	
Green ash	12	1
Chokecherry	10	
Tamarack	5	
Poplar sp.	5	
Golden willow	4	
Elm	4	
Bur oak	3	
Alder	2	1
Colorado spruce	1	
Cottonwood	1	
Caragana	0	1
Miscellaneous	6	
TOTALS	294	6

4.7 PERSONNEL CONTACTED

Table 16 shows the contacts made with personnel of the Saskatchewan Department of Natural Resources and the Saskatchewan Department of Agriculture. The writer wishes to express his appreciation for the co-operation give him by personnel of these departments.

Table 16.

Name	Position	Address	No. of Contacts
R. Zapft	Field Officer	Maple Creek	5
S. Wilson	Patrolman	Maple Creek	3
S. Shannon	Assistant Forester	Cypress Hills P.P.	1
J. Bruce	Field Officer	Kenosee Lake	2
I. Clarke	Ag. Representative	Maple Creek	1

5. ANNUAL REPORT OF FOREST BIOLOGY RANGER

WESTERN DISTRICT OF MANITOBA

1956

by

J. J. Lawrence

INTERIM REPORT - 1956

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

February, 1957

5.1 INTRODUCTION

The field season in the Western District of Manitoba extended from May 15 to September 30, 1956. The period from May 15 to May 30 was spent on construction of a field camp at The Pas. Field surveys to determine the prevalence of forest insects and tree diseases were conducted from June 1 to September 30. Eighteen days of this time were spent retallying permanent sample plots in the Hudson Bay District of Saskatchewan and the Northern and Western districts of Manitoba.

The distribution of forest insect and tree diseases was recorded and the major outbreaks mapped. Special projects included phenological studies on trembling aspen, white spruce, jack pine and tamarack at four separate locations; sequential sampling of larch sawfly egg populations in 8 permanent tamarack plots; mass collections of the larch sawfly and the spruce budworm; and several collections of aphids for special studies by G. A. Bradley.

5.2 REVIEW OF FOREST INSECT AND TREE DISEASES

A further decline in populations of the larch sawfly was again evident in Western Manitoba. Only a trace of defoliation was recorded in the northern half of the district. In the southern portion light to moderate defoliation was noted on tamarack regeneration at Singoosh Lake, Ashville and along the Rolling River Road in Riding Mountain National Park.

Spruce budworm populations increased slightly, and white spruce shelterbelts in the Kenville area suffered moderate to severe defoliation of the new growth. Two light to moderate infestations of the large aspen tortrix occurred; one in the vicinity of Russell and the other in the Ste. Rose -- Shergrove area.

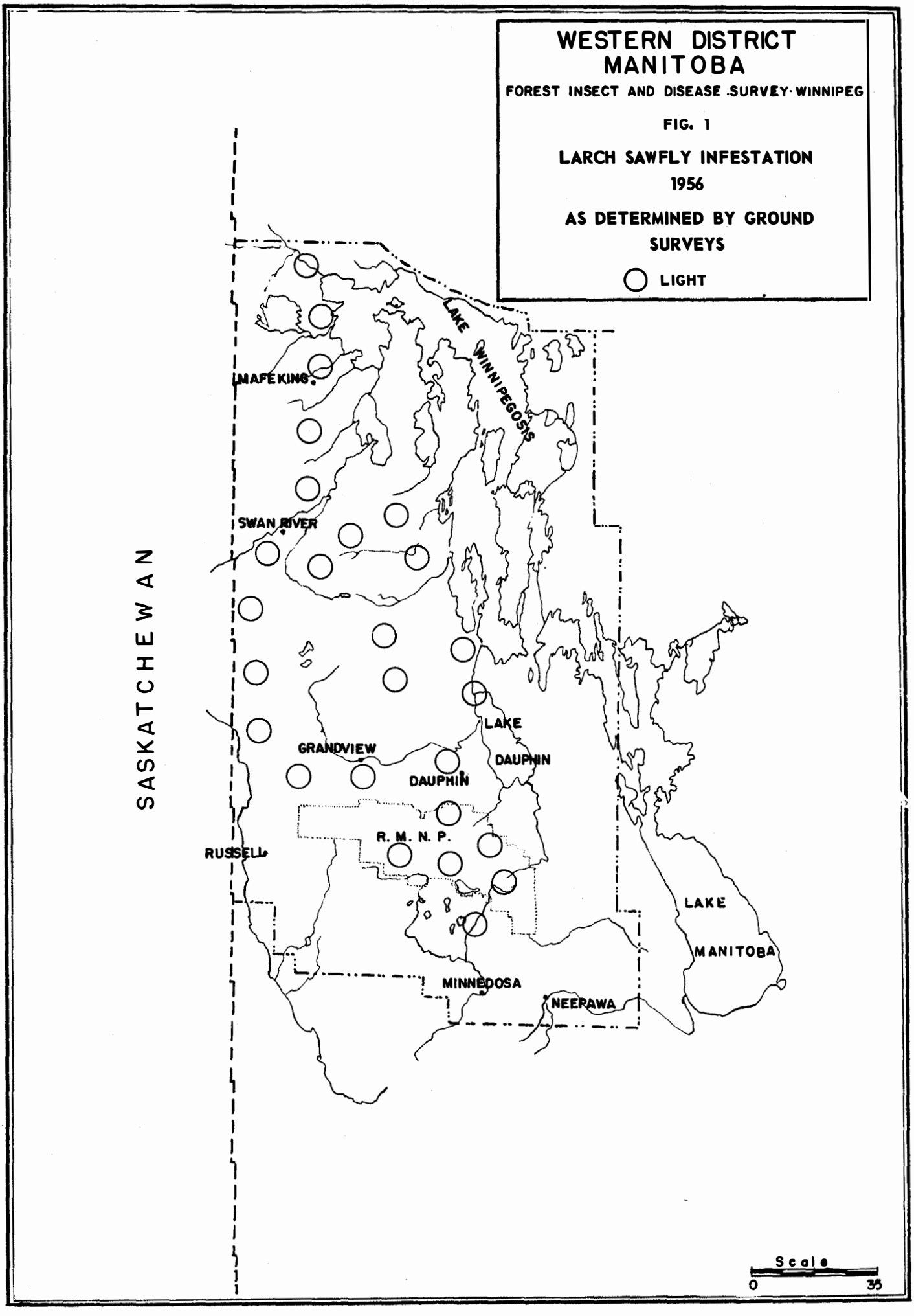
The yellow-headed spruce sawfly and the black-headed budworm were widespread but defoliation was generally light. A few open growing white spruce scattered throughout the district were moderately defoliated by the yellow-headed spruce sawfly. Populations of the jack-pine budworm decreased considerably and defoliation was very light. The gray willow-leaf beetle was more widespread in the district but the degree of skeletonizing of willow foliage remained about the same as in previous years.

An ink spot on aspen, which causes discoloration of the foliage, was again widespread in the southern half of the district. Moderate to severe browning of leaves was recorded in Riding Mountain National Park. A needle disease of spruce caused browning of foliage at Wasagaming and Lake Audy in the Park.

5.3 INSECT CONDITIONS

5.3.1 Larch Sawfly, *Pristiphora erichsonii* (Htg.).

Populations of the larch sawfly showed a further decline in 1956. As shown in Figure 1, defoliation of tamarack was light throughout the entire district. Several tamarack stands were examined in Riding Mountain National Park and Cowan areas and in all cases water levels were again as high as in the previous year. Surface water was present from early May to mid August.


WESTERN DISTRICT
MANITOBA
FOREST INSECT AND DISEASE SURVEY WINNIPEG
FIG. 1
LARCH SAWFLY INFESTATION
1956
AS DETERMINED BY GROUND SURVEYS
LIGHT
SASKATCHEWAN
LAKE WINNIPEGOSIS
MAFEKING
SWAN RIVER
GRANDVIEW
DAUPHIN
LAKE DAUPHIN
R. M. N. P.
RUSSELL
LAKE MANITOBA
MINNEDOSA
NEEPAWA
Scale
0
35

Except for some regeneration along the Rolling River Road (sec. 2, tp. 19, rge. 17, W.P. mer.), which suffered light to moderate attack, defoliation of tamarack in the Riding Mountain National Park was negligible. South of the Park in the Onanole, Crawford Park, Sandy Lake, Rossburn and Glen Elmo areas, only a trace of this insect was noted. As in the Riding Mountain area, defoliation in the Duck Mountain Forest Reserve was confined mainly to regeneration trees. Throughout the remainder of the district, west and north of Dauphin to Roblin, Swan River and the Overflowing River only a trace of defoliation was recorded.

Two days were spent in late August and early September in an attempt to obtain mass collections of larch sawfly cocoons. The cocoons were required for continuing the studies on the distribution and incidence of parasites of the larch sawfly. However, owing to low population levels, only 18 cocoons were collected.

Sequential sampling of egg populations of the larch sawfly was carried out in 8 permanent sample plots. This method replaced the 20 branch samples used in previous years and substantially reduced the time required for obtaining populations estimates. Populations of the larch sawfly were found at a low level in all permanent plots and defoliation was very light.

Sample counts and infestation ratings in permanent sample plots based on the proportion of current shoots which had been utilized for oviposition by adult sawflies are given in Table 1.

Table 1.
Infestation Ratings of the Larch Sawfly
Western District of Manitoba - 1956
(based on the utilization of current shoots for oviposition by adult sawflies)

Plot No.	Location	Results of Sequential Sampling		
		Total shoots counted	No. of curled shoots	Infestation rating
103	Riding Mountain N. P. Sec.5, tp.20, rge.17, WPmer.	60	1	light
104	Riding Mountain N. P. Sec.16,tp.20,rge.19, WP mer.	50	0	light
107	Riding Mountain N. P. Sec.14,tp.21,rge.21, WP mer.	50	0	light
108	Riding Mountain N. P. Sec.36,tp.19,rge.17, WP mer.	70	2	light
110	Cowan Sec.11,tp.35,rge.23, WP mer.	50	0	light
111	Renwer Sec.15,tp.36,rge.23, WP mer.	50	0	light
112	Mafeking Sec.16,tp.46,rge.25, WP mer.	50	0	light
113	Mafeking Sec.19,tp.44,rge.25, WP mer.	80	3	light

During the period from 1949 to 1953, eleven permanent plots were established in representative tamarack stands through the district for studying mortality caused by repeated attacks of the larch sawfly. The plots ranged in size from 1/5 acre to 1/2 acre. All living and dead trees were counted in the original tally. Annual defoliation records were maintained on ten sample trees throughout each plot. The plots were retallied in 1956 to determine the degree of tree mortality. The percentage of loss by basal area, together with defoliation records since 1949, for eleven plots are given in Table 2.

5.3.2 Spruce Budworm, Choristoneura fumiferana Clem.

There was a marked increase in the distribution and abundance of spruce budworm in the district in 1956, but defoliation in most areas was light (Figure 2.).

Several collections of the spruce budworm were taken from white spruce, black spruce, and balsam fir in Riding Mountain National Park; the highest populations occurred in the townsite of Wasagaming. North from Dauphin to Swan River, populations were light and no conspicuous defoliation noted. The same conditions existed from Swan River to the Overflowing River. A decline in populations and only light defoliation was recorded in the area north of Camperville where moderate defoliation of the new growth prevailed in 1955. Along the west side of the Duck Mountain Forest Reserve, from Kenville, Benito and south through Boggy Creek to Bield, defoliation of white spruce by this budworm was light.

Several white spruce shelterbelts, located mainly in the agricultural region of the district, suffered moderate to severe defoliation of the current growth. Very light defoliation was recorded in white spruce shelterbelts at Ste. Rose and between Dauphin and Swan River. Three white spruce shelterbelts examined in the vicinity of Kenville were moderate to severely attacked. Trees ranged from 6 to 8 inches d.b.h. and 30 to 40 feet in height. Examination of the foliage revealed that 1956 was the second year of attack in this area.

5.3.3 Jack-pine Budworm, Choristoneura pinus Free.

Six collections of the jack-pine budworm were taken from the district this year. In all instances only light defoliation was recorded. Populations declined and only a trace of defoliation was noted in the area between Novra and Bellsite where in 1955 defoliation of the current growth ranged from light to moderate. Two collections were taken in Riding Mountain National Park; one along the Norgate Road and the other along the Rolling River Road.

5.3.4 Black-headed Budworm, Acleris variana (Fern.) and Associated Species.

The black-headed budworm was common on both black and white spruce in the entire district but caused little or no defoliation. The largest collection of this species contained only seven larvae. Infestation was light in Riding Mountain National Park and north through Dauphin to Swan River and the Overflowing River. The same conditions were noted south of Swan River through Benito and Boggy Creek to Roblin.

WESTERN DISTRICT MANITOBA

FOREST INSECT AND DISEASE SURVEY WINNIPEG

FIG. 2

DEFOLIATION OF WHITE SPRUCE BY THE SPRUCE BUDWORM 1956

MODERATE

LIGHT

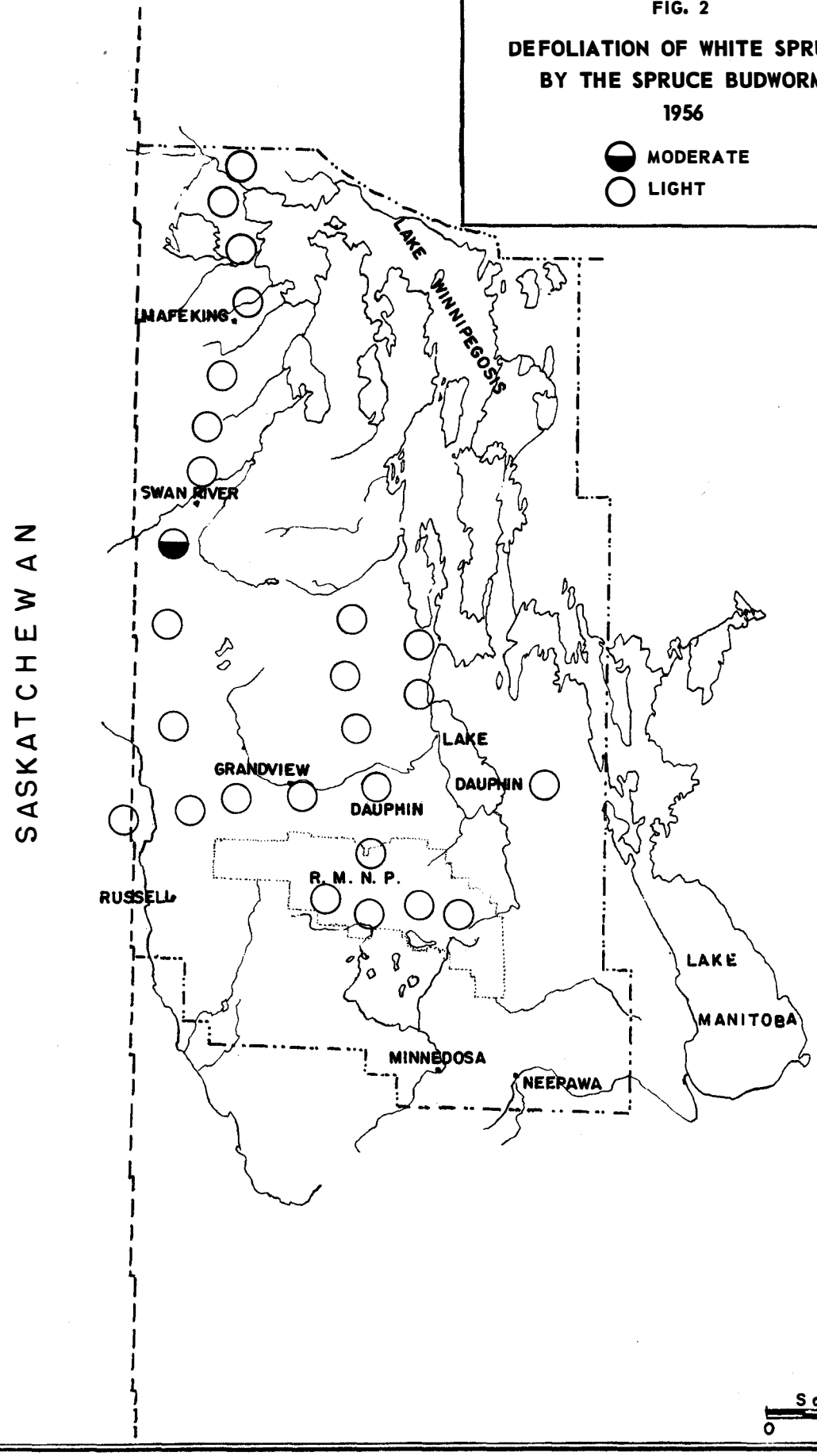


Table 2.

Summary of Permanent Sample Plots in the Western District of Manitoba showing Percentage of Dead Trees by Basal Area and History of Larch Sawfly Defoliation during Period shown by Tally Years (Percentage loss being the Cumulative Mortality)

Plot No.	Tally year	Tamarack only							Total all species			Defoliation history of tamarack		Remarks
		d.b.h. Living trees		d.b.h. Dead trees		Basal area			Basal area					
		Range	Average	Range	Average	Living	Dead	% loss	Living	Dead	% loss	Year	%	
101	1953	1-10	4.7	2-7	3.8	35.061	1.285	3.53	37.598	1.285	3.30	1953 1954	6 2	Small pocket of tL sheltered.
	1956	1-10	3.7	1-5	1.6	15.214	.631	3.98	15.855	.631	3.83	1955 1956	0 0	Surface water till late summer during 1955-56.Undisturbed
103	1949	1-9	4.1	1-6	1.8	16.833	.816	4.62	20.929	1.022	4.66	1949 1950 1951 1952	43 39 35 10	Trace of needle cast,occasional dead top 1955-56.
	1956	1-10	4.0	1-7	3.1	14.820	2.061	12.21	20.751	2.526	10.85	1953 1954 1955 1956	3 0 0 0	Surface water most of summer-undisturbed
104	1949	1-7	2.4	---	---	15.711	0	--	17.180	0	--	1949 1950 1951 1952	7 6 6 5	Surface water till late summer 1955-56. Some needle cast 1954. Plot
	1956	1-8	4.0	1-2	1.2	7.888	.042	.53	9.610	.042	.44	1953 1954 1955 1956	2 0 0 0	size changed 1/2 x 10 chns. to 1/2 x 5 in 1954. Undisturbed
105	1949	1-6	3.0	1-	1.0	9.4 7	.010	.10	11.688	.010	.08	1949 1950 1951 1952	14 16 19 4	Surface water till late summer 1955-56. Light needle
	1956	1-6	3.1	1-	1.0	9.396	.010	.11	12.323	.010	.08	1953 1954 1955 1956	2 0 0 0	cast 1954. Undisturbed

Table 2 continued

Plot No.	Tally year	Tamarack only: d.b.h. Living trees Range	Tamarack only: d.b.h. Living trees Average	Tamarack only: d.b.h. Dead trees Range	Tamarack only: d.b.h. Dead trees Average	Tamarack only: Basal area Living	Tamarack only: Basal area Dead	Tamarack only: Basal area % loss	Total all species: Basal area Living	Total all species: Basal area Dead	Total all species: Basal area % loss	Defoliation history of tamarack: Year	Defoliation history of tamarack: %	Remarks
107	1949	1-11	2.8	1-13	3.0	10.386	.947	8.36	10.530	.969	8.43	1949 1950 1951 1952	11 20 28 10	Surface water till late summer 1955-56, north half of plot open growing. Undisturbed.
	1956	1-12	3.1	1-13	2.4	10.275	1.001	8.88	10.739	1.001	8.53	1953 1954 1955 1956	2 1 0 0	
108	1949	1-10	4.8	1-7	3.3	16.180	.946	5.52	18.973	.946	4.75	1949 1950 1951 1952	31 23 15 2	Surface water till late summer 1955-56. Tagged trees Nos. 627-28-29 and 30 retagged. Undisturbed
	1956	1-9	5.5	1-6	2.2	14.320	.379	2.58	16.936	.423	2.44	1953 1954 1955 1956	1 0 1 0	
109	1949	1-9	5.29	1-2	1.66	11.638	.049	.419	20.917	.071	.338	1949 1950 1951 1952	14 13 11 3	Surface water till mid summer 1955-56. Good growth during these years. Undisturbed.
	1956	1-10	5.67	1-5	5.00	9.713	.408	4.031	20.036	.603	2.922	1953 1954 1955 1956	2 1 1 0	
110	1949	1-8	4.42	1-	1.00	7.236	.005	0.07	8.656	.027	0.31	1949 1950 1951 1952	22 88 98 3	Surface water till late summer 1955-56. Tree Nos.641-44-45 died 1954 & re-tagged. Undisturbed.
	1956	3-8	5.02	1-3	1.80	7.035	.206	2.845	8.346	.206	2.409	1953 1954 1955 1956	0 0 0 0	

Table 2 continued

Plot No.	Tally year	Tamarack only: d.b.h. Living trees Range	d.b.h. Living trees Average	d.b.h. Dead trees Range	d.b.h. Dead trees Average	Basal area Living	Basal area Dead	Basal area % loss	Total all species Basal area Living	Total all species Basal area Dead	Total all species Basal area % loss	Defoliation history of tamarack Year	Defoliation history of tamarack %	Remarks
111	1949	1-7	4.25	1-6	2.91	13.429	2.047	13.227	16.085	2.405	13.007	1949 1950 1951 1952	26 69 92 4	Surface water till late summer 1955-56. Good growth since plot re-established. Undisturbed.
	1956	1-7	4.23	2-4	2.87	9.563	.387	3.890	10.956	.409	3.599	1953 1954 1955 1956	1 0 0 0	
112	1949	1-4	1.32	1-	1.00	3.912	.025	.635	5.644	.C74	1.294	1949 1950 1951 1952	65 97 94 9	Very dry site, good growth '53, fair '54, good 55-56. Undisturbed.
	1956	1-4	1.46	1-2	1.02	4.378	.217	4.722	7.220	.484	6.282	1953 1954 1955 1956	3 5 0 0	
113	1949	1-7	3.15	1-5	1.80	7.716	.156	1.982	14.173	.183	1.274	1949 1950 1951 1952	34 97 78 12	Dry site. Tree Nos. 783-88-85 died. Retagged 1954. Fair to good growth 1955-56. Undisturbed
	1956	2-6	3.38	1-4	1.75	4.236	.619	12.750	13.888	.714	4.890	1953 1954 1955 1956	5 1 1 0	

A complex of species, which caused moderate defoliation and damage to the cones of "club-topped" black spruce in some areas last year was not conspicuous. Feeding on the foliage and cones was restricted to the extreme upper portion of the crown and could be detected only after the tree had been felled.

Special sampling of "club-topped" black spruce was employed at two points in the district to determine the insect species present, their abundance, defoliation and damage, and the part of the tree attacked. One branch was removed from the lower and mid crown levels and three from the upper crown level of each tree examined. Insect species were recorded by "branch area" on which they were feeding; (1) insects feeding on new foliage; (2) insects feeding on cones; (3) insects feeding on old foliage; and (4) insects for which part of tree attacked could not be determined.

The results of the examinations in two areas of the district are shown in Table 3.

5.3.5 Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.).

The yellow-headed spruce sawfly occurred in most white and black spruce stands examined throughout the district but, except for a few small localized infestations, defoliation was light. A few open growing trees north of Grandview, in the vicinity of Bellsite, and along the Lake Audy Road in Riding Mountain National Park were moderately defoliated.

Severe defoliation of the current growth of white spruce by this species was noted in a shelterbelt at Onanole. Examination of the old foliage indicated that 1956 was the second year of severe defoliation on these trees. Some tree mortality was noted in this shelterbelt but it could not be attributed to this insect.

5.3.6 Green-headed Spruce Sawfly, Pikonema dimmockii (Cress.).

Populations of the green-headed spruce sawfly remained at a low level and caused no noticeable defoliation of black and white spruce. This species was generally found closely associated with the yellow-headed spruce sawfly.

5.3.7 Balsam-fir Sawfly, Neodiprion abietis (Harr.).

Only three collections containing larvae of the balsam-fir sawfly were obtained this season. One collection was taken nine miles southwest of Benito, another twenty miles southwest of Benito, and the third along the Whirlpool Lake Road in Riding Mountain National Park. In all instances defoliation of spruce was negligible.

The relative abundance of the various species of sawflies and budworms in collections taken from permanent white and black spruce sample stations is given in Table 4. Results shown in the table are based on standard five tree beating samples.

Table 3.

Percentage of Defoliation and Degree of Cone Damage to "Club-topped" Black Spruce caused by a Complex of Insect Species
Western Manitoba - 1956

Location of Plot	Tree species	Time of Examination	Lower Crown Branch		Mid Crown Branch		Upper Crown Branch		Av. No. of cones per branch	Percentage of cones damaged
			Area (sq.in.)	Per cent defol.*	Area (sq.in.)	Percent defol.*	Area (sq.in.)	Per cent defol.*		
Mafeking, Manitoba	bS	6/6/56	1080	nil	1080	nil	702	18	30	30
	bS	17/9/56	156	nil	216	nil	259	25	44	8
R.M.N.P., Manitoba	bS	12/7/56	246	nil	216	nil	388	17	75	10
	bS	19/9/56	210	nil	248	nil	354	30	78	6

* Percentage of defoliation based on current growth only -- no defoliation apparent on old foliage.

Table 4
Incidence and Abundance of Sawflies and Budworms
in Collections taken from Permanent Black and White Spruce
Sample Station
Western Manitoba - 1956

Insect Species	Host	No. of host tree samples	Percentage of samples containing larvae	Average No. of larvae per 5 tree sample (Positive sample)
Spruce budworm	wS	19	32	2
	bS	1	100	1
Black-headed budworm	wS	19	37	3
	bS	1	0	0
Yellow-headed spruce sawfly	wS	19	5	1
	bS	1	0	0
Green-headed spruce sawfly	wS	19	26	1
	bS	1	0	0
Balsam-fir sawfly	wS	19	5	5
	bS	1	0	0

5.3.8 American Poplar Leaf Beetle, Gonioctena americana (Schaeff.).

This species was more widespread throughout the district than in 1955. Defoliation was confined to regeneration trembling aspen up to 1 1/2" d.b.h.

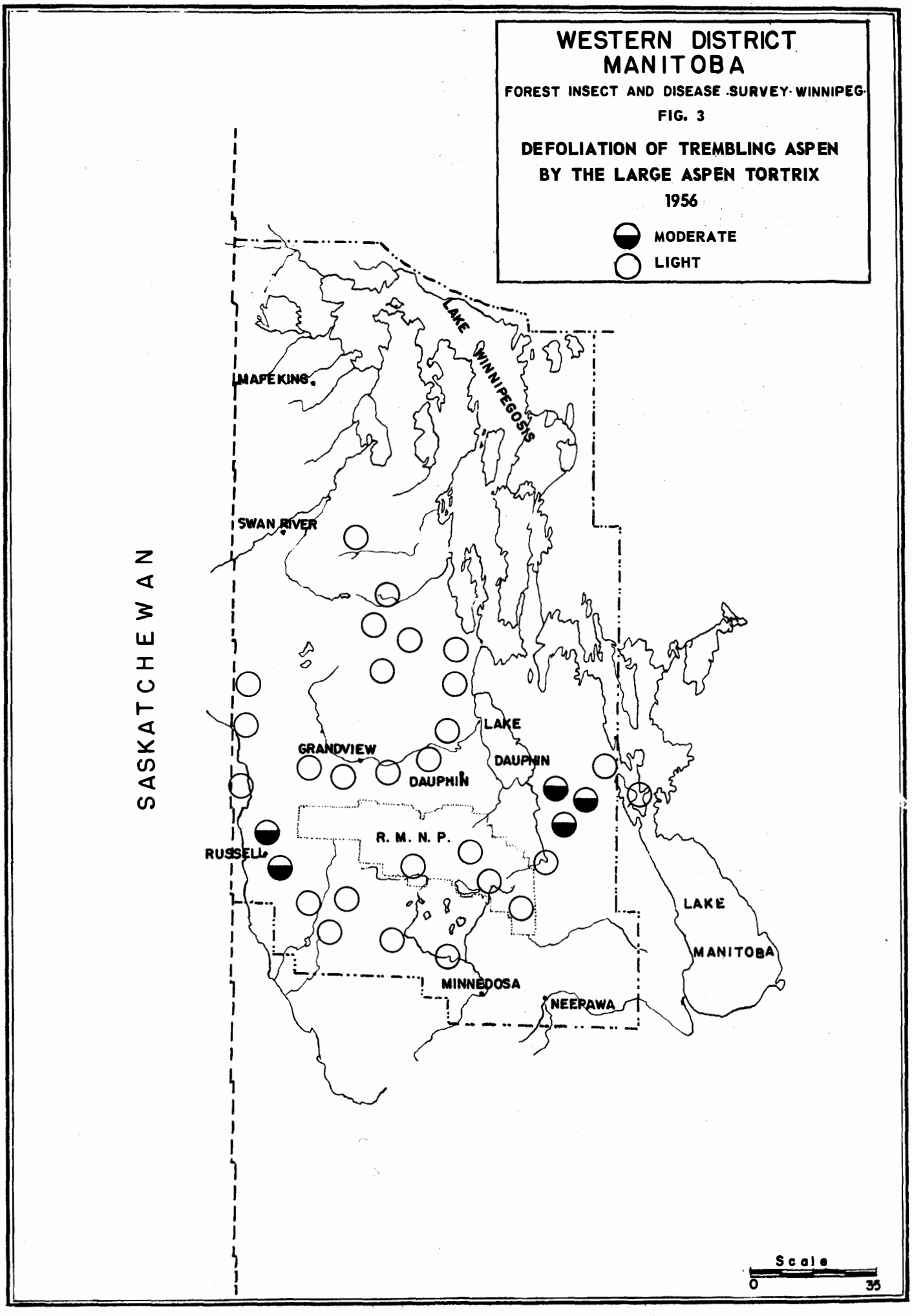
In the Riding Mountain National Park and Dauphin areas, only very light defoliation was noted. Northwest of Grandview along the southern slopes of the Duck Mountain Forest Reserve, patches of light to moderate feeding were recorded. Another small area of light to moderate defoliation occurred 6 miles west of Cowan along No. 10 highway. Between Novra and Bellsite scattered areas of light to moderate defoliation were recorded. Elsewhere in the district, defoliation was light.

5.3.9 Aspen Blotch Miner, Lithocolletis salicifoliella Chamb.

Two collections of this aspen blotch miner were made in widely separated areas. One collection was taken north of Winnipegosis and the other in the vicinity of Vista. In both instances mining of trembling aspen foliage was light.

5.3.10 Large Aspen Tortrix, Choristoneura conflictana (Wlk.).

Increased populations of the large aspen tortrix caused some defoliation of trembling aspen in parts of the district in 1956 (Figure 3). Light defoliation of aspen extended from Minnedosa west to Russell and in the vicinity


WESTERN DISTRICT
MANITOBA
FOREST INSECT AND DISEASE SURVEY WINNIPEG
FIG. 3
DEFOLIATION OF TREMBLING ASPEN
BY THE LARGE ASPEN TORTRIX
1956
MODERATE
LIGHT
SASKATCHEWAN
LAKE WINNIPEGOSIS
MAFEKING
SWAN RIVER
GRANDVIEW
DAUPHIN
LAKE DAUPHIN
R. M. N. P.
RUSSELL
LAKE MANITOBA
MINNEDOSA
NEEPAWA
Scale
0
35

of Roblin. Moderate defoliation was recorded in the area between Russell and Roblin.

East of Dauphin through Ochre River, Sheregrove and Reykjavik, defoliation was light. Northeast of Sheregrove defoliation ranged from light to moderate. In the vicinity of Laurier, McCreary and Norgate defoliation of aspen was also light.

5.3.11 Ugy Nest Tortrix, Archips cerasivorana Fitch.

Nests of the ugly nest caterpillar were found at widely scattered points throughout the Western District but generally caused no significant defoliation. A small area of heavily webbed bushes was observed along the Audy Lake Road in the Riding Mountain National Park (Figures 6 and 7). Two other more or less isolated infestations of light to moderate damage occurred at the following points; 2 1/2 miles west of Pine River and 1 mile north of Cowan. Another collection was made 2 miles north of Cowan but defoliation in this instance was very light.

5.3.12 Forest Tent Caterpillar, Malacosoma disstria Hbn.

A single collection of the forest tent caterpillar was made from trembling aspen along No. 10 highway 9 1/2 miles north of Clear Lake in the Riding Mountain National Park. Only one larva was found and defoliation was negligible.

5.3.13 Fall Cankerworm, Alsophila pometaria (Harr.).

This insect was found feeding on ornamental shade trees in the townsites of Dauphin and Swan River. In Dauphin, defoliation of both elm and Manitoba maple was light to moderate.

In Swan River, defoliated varied considerably. Along the river banks in the northern section of town, defoliation was severe while it was light to moderate in the central section and only light in the southeastern portion of the townsite. The majority of the trees attacked were Manitoba maple.

5.3.14 Spotless Fall Webworm, Hyphantria textor (Harr.).

Collections of this insect were made at the following locations: Dauphin, Ashville, Ethelbert and Cowan. Defoliation was light at all locations excepting 9 miles west of Dauphin where light to moderate feeding was recorded on three or four clumps of alder.

5.3.15 White-pine Weevil, Pissodes strobi (Peck).

There was no change in the status of this insect the past season. Damage noted consisted of old dead leaders on white spruce along the Norgate Road; Lake Audy Road and Dauphin Trail in Riding Mountain National Park.

Fig.6

Fig.7

Figs.6 and 7. Tents of Archips cerasivorana on Chokecherry. Audy Lake, Man.
Photographs by J.J. Lawrence.
Negative Numbers W-496
W-497

5.3.16 Pine Tortoise Scale, Toumeyella numismaticum (Pettit. & McD.).

A total of 3 collections of this insect was made during the past season. Of these, one was taken in the nursery at Birch River; one 2 1/2 miles north of Bellsite. At all three locations damage to jack pine was very light.

5.3.17 Spruce Seed Moth, Laspeyresia youngana (Kearf.).

A collection of this insect was made on white spruce 9/10 of a mile north of Camperville (sec. 18, tp. 35, rge. 19, W. P. mer.). Some of the cones collected were removed from the tree and others were gathered from the ground. There appeared to be very little difference in the percentage of infested cones whether on the ground or on the three. At the time of examination it was estimated that 30 per cent of the cones were infested with this seed moth.

5.3.18 A Root Weevil, Hypomolyx sp.

This root weevil occurred on jack pine reproduction along the Rolling River and Norgate roads in Riding Mountain National Park. In the former area, about 10 per cent of the trees 1" d.b.h. and less were dead or dying. Weevil damage was usually confined to root collar just below ground level. In the latter area, the infestation was scattered and only a relatively small percentage of the trees were affected.

A population and damage appraisal survey was conducted in a white spruce stand in Riding Mountain National Park (sec. 7, tp. 20, rge. 19, W. P. mer). Stand composition and tree mortality in the area was determined by a random pairs cruise. Weevil damage to the roots of white spruce was appraised by critical examination of the root systems of 10 sample trees. A damage index was applied to each infested root.

The stand composition and tree mortality together with the degree of root damage in the plot is shown in Tables 5 and 5a.

Table 5.
Summary of Mortality Cruise by Random Pair Method
(Riding Mountain National Park - 1956)

Western District of Manitoba Area No. 1 Sec. 7, tp. 20, rge. 19, WP mer.

Tree species	Distribution of Random Pairs by Diameter Class (expressed as No. of trees)								Percentage distribution by tree species	
	3 - 6.5		6.6 - 9.5		9.6 - 12.5		12.6 - +			
	L	D	L	D	L	D	L	D	L	D
White spruce	27	4	26	2	7	3	17	0	55.0	6.4
Trembling aspen	6	0	13	0	19	0	16	0	38.6	0.0

No. of Pairs Tallied..... 70
Average Distance Between pairs.... 15.3 ft.
Estimated Stems per Acre.....215

Table 5a.
Hypomolyx spp. Damage Index and Percentage
Diseased Roots in a Ten Tree Sample in above Plot

Western District of Manitoba Area No. 1 Sec. 7, tp. 20, rge. 19, W.P.mer.

Tree No.	d.b.h.	Tree height	Hypomolyx damage index	Total Percentage of roots diseased	Percentage of the diseased roots with insect damage
1	10.5	60	1.20	0	0
2	7.0	45	2.00	25	0
3	26.0	90	1.48	10	100
4	10.0	60	1.38	0	0
5	13.0	70	1.55	0	0
6	12.0	60	3.90	20	100
7	16.0	90	4.00	0	0
8	13.0	70	2.40	0	0
9	16.0	75	0.25	0	0
10	22.0	75	1.00	0	0

The cruise indicated that approximately 9 per cent of the white spruce within the cruise limits were dead. As noted in Table 5a, Hypomolyx damage index ranged from 0.25 to 4.00. Of the ten trees examined only three showed evidence of diseased roots while all the trees showed evidence of old Hypomolyx damage indicating that under optimum conditions trees may in most cases recover from attack.

5.3.19 Birch Sawfly, Arge pectoralis (Leach.).

Two samples of the birch sawfly were collected during the season; one along the north shore of Clear Lake and the other 14.6 miles northeast of Clear Lake. At both locations defoliation was very light.

5.3.20 A Webworm, Tetralopha asperatella (Clem.).

Collections of this insect were made at the following locations: Sandy Lake, Angusville, Russell, Laurier, Ste. Rose, Shergrove, Dauphin, Ashville, Ethelbert, Grandview and Bield. Although larvae were commonly found on trembling aspen little or no damage was encountered.

5.3.21 Gray Willow-leaf Beetle, Galerucella decora (Say).

This insect continued to skeletonize willow foliage in widely scattered areas throughout the district. Between Minnedosa and Birtle, along No. 4 highway, damage by this insect was light. Moderate to severe skeletonizing was noted between Birtle and Foxwarren. From Foxwarren north to Roblin, browning of foliage was light and very patchy.

Along the south boundary of Riding Mountain National Park through Sandy Lake, Elphinstone, and Rossburn light damage was encountered. Very little

skeletonizing of willow was noted throughout Riding Mountain National Park.

From Norgate, north and east through McCreary to Ste. Rose widely scattered clumps of willow suffered moderate to severe skeletonizing. North east of Ste. Rose to Reykjavik damage was light. North of Dauphin through Ashville, Ethelbert to Pine River skeletonizing of willow was light to moderate with the occasional clump severely damage. Elsewhere in the district where this insect occurred it caused only light damage to willow.

5.3.22 Balsam Gall Midge, Itonida balsamicola (Lint).

Although this insect was commonly found on balsam-fir it caused little or no serious damage throughout the district.

The heaviest concentration of galls were found in Riding Mountain National Park in a small stand of balsam fir ranging from 1 inch to 4 inches d.b.h. (Figure 6a). This stand was about 1 mile east of the townsite along the lake shore road. A moderate infestation of the gall midge was noted in this area, but infested needles were not as abundant as in 1955.

5.4 TREE DISEASE CONDITIONS

5.4.1 Ink Spot on Aspen, Ciborina bifrons.

This condition on trembling aspen was very common throughout Riding Mountain National Park. In other areas damage to foliage by this disease was very light.

North of Clear Lake from a point approximately 8 miles south of the North Gate to the park boundary an average of 50 per cent of the leaves were infected with the occasional tree showing as high as 75 per cent infection. Along the eastern slopes near the East Gate, the degree of infection ranged from 75 to 95 per cent. These areas consisted mainly of pure trembling aspen stands. Another small area of moderate damage occurred along the Lake Audy Road. Damage in the remainder of this area was light.

East of Riding Mountain National Park in the McCreary, Ste. Rose and Reykjavik areas the fungus occurred occasionally. The same conditions applied to the western portion of the district along #4 highway between Minnedosa and Roblin.

5.4.2 Shoestring Root Rot, Armillaria mellea

Two collections of this fungi were taken along the Rolling River Road in Riding Mountain National Park. It was found on the roots of dead or dying jack pine infested with a weevil, Hypomolyx spp. About 10 per cent of the jack pine reproduction was affected. None of the apparently healthy trees examined had this disease.

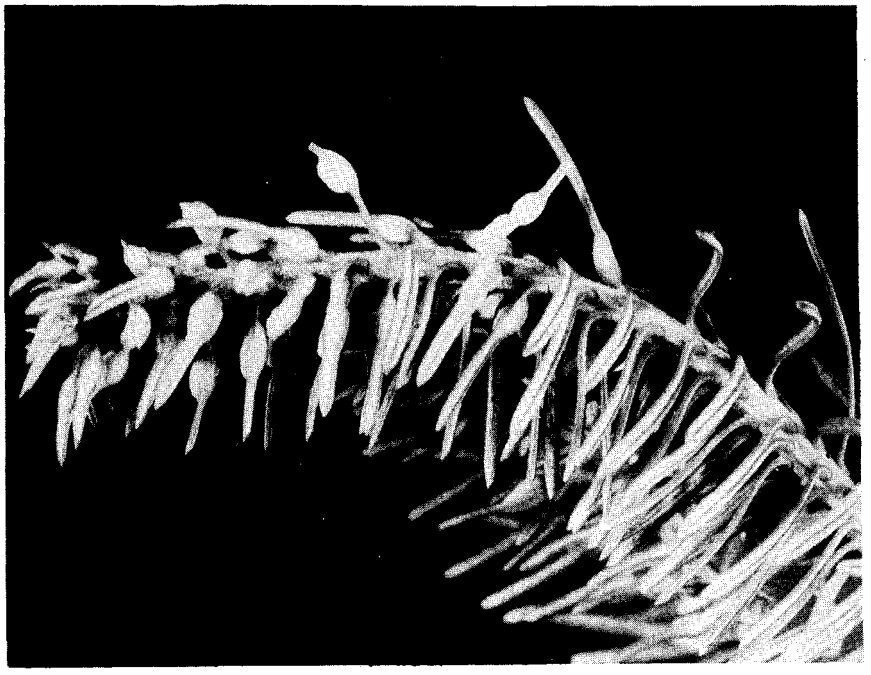


Fig.6

Balsam Fir Needles Infested With Itonida balsamicola. R.M.N.P., Man.
Photograph by B. McLeod.
Negative Number W-498

5.4.3 Needle Cast of Tamarack.

Needle cast of tamarack was found in nearly all the tamarack stands examined in Riding Mountain National Park. However, damage was light with about 5 per cent of the trees showing infection. Throughout the remainder of the district only a trace of needle cast was noted.

5.4.4 Needle Disease of Spruce, Macrophoma parea.

This disease was found at two locations in Riding Mountain National Park. One in the townsite of Wasagaming on white spruce and the other in a white spruce plantation at Lake Audy. This fungus caused the previous year's (1955) needles to turn brown.

In the townsite of Wasagaming the diseased trees were widely scattered with damage to the needles ranging from 25 to 50 per cent. In the plantation at Lake Audy, up to 75 per cent of the trees were infected and from 50 to 75 per cent of the needles affected. The trees were 3 to 4 inches d.b.h. and about 18 feet in height.

5.5 SPECIAL PROJECTS

5.5.1 Mass Collections.

During the season several collections of insect and disease material were made for projects being conducted at the Winnipeg and other laboratories. The purpose and type of collections are shown in Table 6.

Table 6.
Summary of Special Collections

Type and purpose of collection	No. of Collections	Days spent making collections (including travel)
Larch sawfly larvae for J. Muldrew	1	1
Spruce budworm larvae for Dr. Stehr	1	1/2
Aphid collection for G. A. Bradley	7	1
Spruce foliage for Saskatoon Laboratory	2	1/2

5.5.2 Phenological Studies.

Four sampling stations were selected in Western Manitoba for phenological studies. Four tree species, white spruce, tamarack, jack pine, and trembling aspen, were selected at each location. One branch on each of five trees per species was tagged. Tags were placed at eye level for ease of re-locating terminals to be measured. The first measurement of terminal shoots was taken between June 24 and July 13 or when growth was 25 to 50 per cent complete. Measurements were again made after shoot growth was complete, August 17 to September 17.

This study is being carried out for the purpose of obtaining data on the variation of tree growth by locality and years throughout Manitoba and Saskatchewan.

The number of sample stations, their locations and the tree species represented are given in Table 7.

Table 7.
Locations of Phenological Stations Established
in Western Manitoba in 1956

Location	Tree Species	Dates Examined		sec., tp., rge., mer.
Pine River	T. aspen	10/7/56	27/8/56	31 32 22 WP
	J. pine	10/7/56	27/8/56	
	W. spruce	10/7/56	27/8/56	
Rolling River Road R.M.N.P.	T. aspen	29/6/56	19/8/56	10 19 17 WP
	J. pine	29/6/56	19/8/56	
	W. spruce	29/6/56	19/8/56	
	Tamarack	29/6/56	19/8/56	
Singoosh Lake D.M.F.R.	T. aspen	13/7/56	17/8/56	30 30 24 WP
	J. pine	13/7/56	17/8/56	
	W. spruce	13/7/56	17/8/56	5 30 24 WP
	Tamarack	14/7/56	17/8/56	32 30 24 WP
Mafeking	T. aspen	24/6/56	17/9/56	32 44 25 WP
	J. pine	24/6/56	17/9/56	
	W. spruce	24/6/56	7/9/56	
	Tamarack	24/6/56	7/9/56	

5.6 SUMMARY OF INSECT AND TREE DISEASE COLLECTIONS

A complete summary of all insect and tree disease collections taken from the principal tree species in the Western District of Manitoba in 1956 is shown in Table 7.

Table 7.
Summary of Insect and Tree Disease Collections - 1956
Western Manitoba

No. of Insect Samples			No. Tree Disease Samples	
Host	Biology Rangers	Co-Operators	Host	Biology Rangers
W. spruce	78	6	T. aspen	7
B. spruce	30		W. spruce	3
Balsam fir	4	1	Jack pine	3
Jack pine	25		B. spruce	1
Tamarack	25	2	Tamarack	2
T. aspen	61		Ash	1
B. poplar	3			
Willow	7	1		
W. birch	11			
Chokecherry	4			
Alder	3			
Manitoba maple	1	1		
Oak	1			
Elm	1			
Ash		1		
Misc.		1		
TOTALS	244	13		17

5.7 PERSONNEL CONTACTED

The following table contains a list of Manitoba Forest Service, Parks Board and Dominion Forest Service personnel who were contacted during the 1956 field season. The contacts were made primarily for the purpose of acquainting forestry officials with insect and tree disease conditions within their respective areas and to investigate reported insect infestations and disease outbreaks.

Table 9.
Personnel Contacted

Name	Title	Address	No. of Contacts
E. A. Koons	District Forester	Dauphin	5
J. Koke	Chief Ranger	"	5
B. Balchen	Forest Engineer	"	2
G. Bates	Sr. Forest Ranger	Swan River	2
C. Dowsan	Ranger	Minitonas	1
A. Briggs	Ranger	Bield	1
J. B. Norman	Ranger	Birch River	2
W. M. Presloski	Ranger	Mafeking	2
P. Perchuk	Ranger	Sprague	4

R.M.N.P.

K. B. Mitchel	Park Superintendent	Wasagaming	1
J. C. Goodison	Forest Engineer	"	2
J. Allan	Chief Warden	"	2
C. A. Campbell	Warden	"	1
D. B. Binkley	Warden	Elphinstone	3

Dominion Forest Service

C. C. Thomson	Officer-in-Charge	Wasagaming	2
J. Jameson	Research Officer	"	2
S. Rowe	Research Officer	"	3
H. Johnston	Research Officer	"	3
M. Wheaton	Forester	"	2

6. ANNUAL REPORT OF FOREST BIOLOGY RANGER NORTHERN DISTRICT OF MANITOBA

1956

by

J. B. Martin

INTERIM REPORT - 1956

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

February, 1957

6.1 INTRODUCTION

Field surveys were carried on from May 23 to September 15 in 1956 to determine the distribution and status of forest insects and tree diseases in the Northern District of Manitoba. Major insect infestations were mapped and the occurrence and distribution of minor insect species were recorded. Special projects included; sequential sampling of egg populations of the larch sawfly; foliage production and defoliation studies on tamarack; mass collections of spruce budworm larvae and spruce budworm egg mass counts; phenological studies on spruce, tamarack, trembling aspen and jack pine; special aphid collections; mass collections of balsam fir needle cast; and seed collections from birch, tamarack and balsam fir.

Insect samples collected totalled 218 and disease samples 26. Collections submitted by Forest Service personnel numbered 5, but it must be noted that 1956 was the worst season on record for forest fires in this district. The assistance and co-operation of the Manitoba Forest Service personnel is gratefully acknowledged.

6.2 REVIEW OF FOREST INSECTS AND TREE DISEASES

Three major insect species were generally distributed through the district in 1956. They were the larch sawfly, the spruce budworm and the black-headed budworm. Of these, only the spruce budworm caused serious defoliation. The spruce budworm infestation at Namew Lake increased in both size and intensity. The black-headed budworm dropped to endemic levels and caused no noticeable defoliation. The larch sawfly populations again decreased and caused only a trace to very light defoliation throughout the district.

Insects whose status remained static were: the pitch nodule maker, the forest tent caterpillar, the balsam fir sawfly, the yellow-headed and the green-headed spruce sawflies. Populations of the American poplar leaf beetle increased slightly while the large aspen tortrix decreased slightly.

A severe infection of needle rust of spruce, Chrysomyxa sp., continued to decrease. Jack pine mistletoe, Arceuthobium americanum continued to infect trees over a large area. The parasite of this mistletoe, Wallrothiella arceuthobii, was not found in 1956.

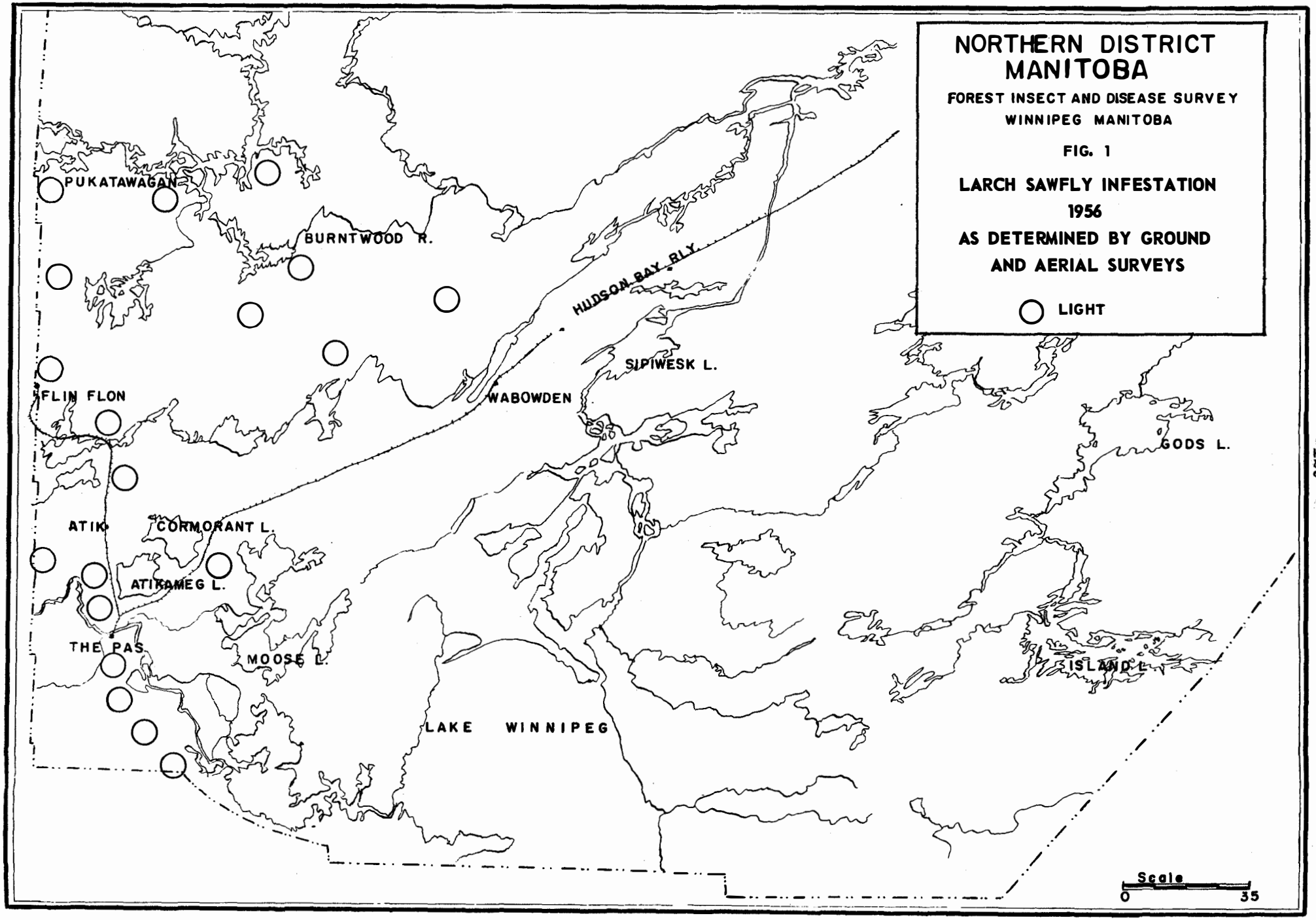
A root fungus, Armillaria mellea infected jack pine, spruce, and balsam fir in the area from The Pas to Wanless. This root fungus was present on about five per cent of the jack pine regeneration in this area.

Other noteworthy diseases were; black knot of cherry, Dibotryon morbosum, stem rust gall on jack pine, Globose cronartium, chlorosis of spruce, a needle cast of spruce and a needle cast of balsam fir.

6.3 INSECT CONDITIONS

6.3.1 Larch Sawfly, Pristiphora erichsonii (Htg.).

The larch sawfly infestation on tamarack continued to decrease in severity. The infestation ranged from nil to light and was much lighter than in 1955. No defoliation of consequence was seen or reported. Tamarack foliage was again sparse, especially in the top third of the crown.


NORTHERN DISTRICT
MANITOBA
FOREST INSECT AND DISEASE SURVEY
WINNIPEG MANITOBA
FIG. 1
LARCH SAWFLY INFESTATION
1956
AS DETERMINED BY GROUND
AND AERIAL SURVEYS
LIGHT
PUKATAWAGAN
BURNTWOOD R.
HUDSON BAY RLY.
SIPIWESK L.
WABOWDEN
FLIN FLON
GODS L.
ATIK
CORMORANT L.
ATIKAMEG L.
THE PAS
MOOSE L.
LAKE WINNIPEG
ISLAND L.
Scale
0
35

Egg population sampling was conducted at four permanent tamarack plots in the District. The infestation at each plot was rated on the percentage utilization of current shoots for oviposition by adult sawflies. Sample counts and infestation ratings are given in Table 1.

Table 1.
Population Estimates of Larch Sawfly
(based on percentage utilization of new shoots for oviposition by adult sawflies)

Plot No.	Place	Location				Total shoots examined	No. of curled shoots	Infestation Rating* 1956
		Sec.	Tp.	Rge.	Mer.			
101	The Pas	24	57	26	WP	80	3	L
102	Cranberry Ptge.	18	65	26	WP	70	2	L
103	Beaver Lake	17	63	1	W2	60	1	L
105	The Bog	20	50	25	WP	50	0	VL

* L - light; VL - very light

The lowest populations were again in The Bog area. Sampling in The Pas, Cranberry Portage and Beaver Lake areas yielded very few larvae.

During August and September an attempt was made to collect cocoons to determine the abundance and distribution of parasites and disease organisms. Due to the low populations no cocoons could be collected in 1956.

In 1954, four permanent plots were established in representative tamarack stands throughout the district for the purpose of determining tamarack mortality caused by repeated defoliation by the larch sawfly. The plots were 1/5 acre in size. All living and dead trees on the plots were tallied. Annual defoliation records were maintained on ten marked trees within each plot during the infestation period from 1954 to 1956. The plots were retallied in 1956 to determine the degree of tree mortality which had occurred since 1954. The percentage of losses by basal area together with the annual defoliation records for each plot are shown in Table 2.

6.3.2 Spruce Budworm, Choristoneura fumiferana Clem.

The spruce budworm infestation on white spruce and balsam fir at the northeast end of Namew Lake on the Manitoba-Saskatchewan border continued unabated in 1956. The area infested at Namew Lake increased and another infested area was found at Saskoba Lake 12 miles northwest of the original infestation.

The degree of infestation is shown in Fig. 2b and the areas defoliated from 1955 to 1956 are shown in Table 3.

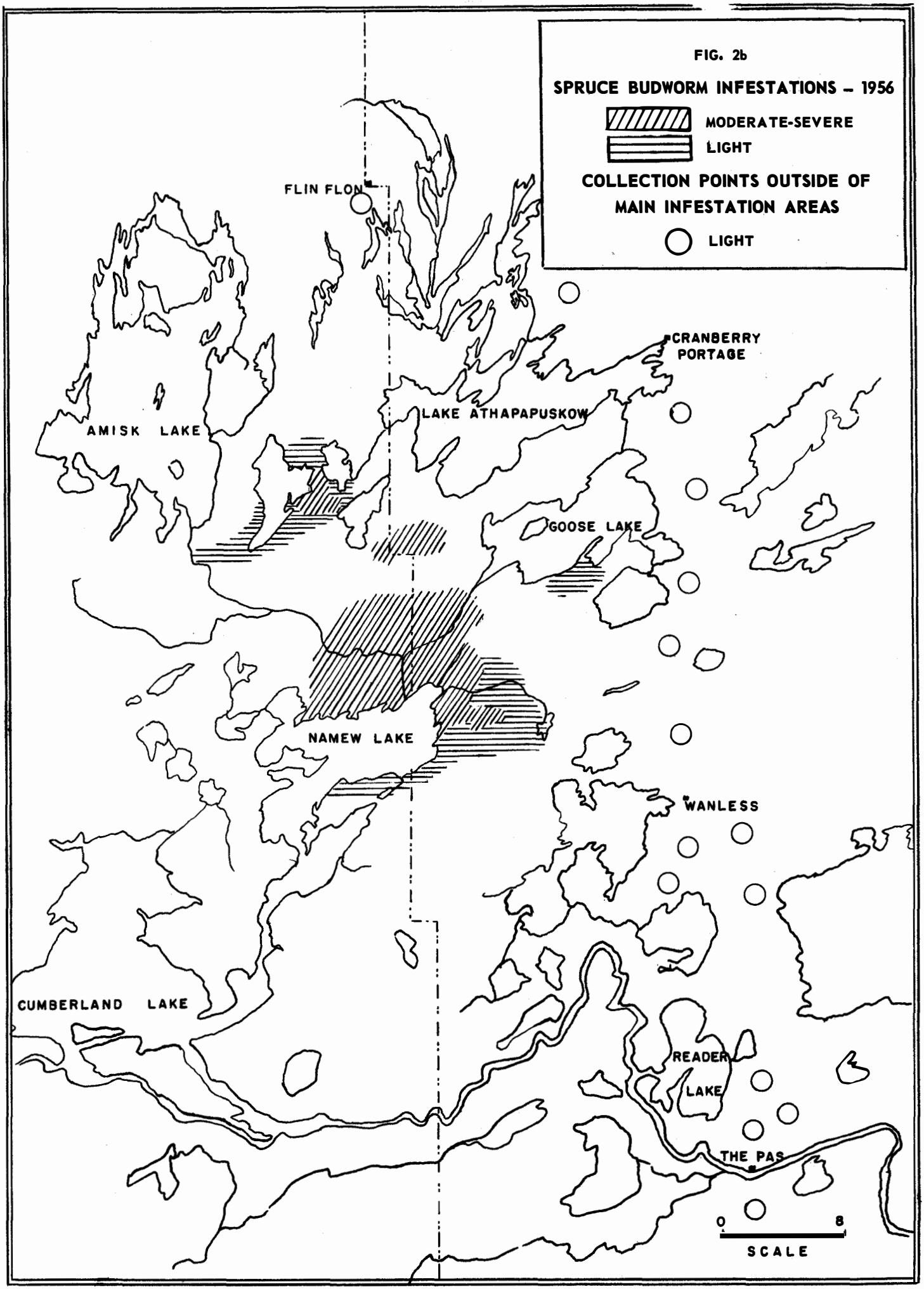


FIG. 2b
SPRUCE BUDWORM INFESTATIONS – 1956
MODERATE-SEVERE
LIGHT
COLLECTION POINTS OUTSIDE OF MAIN INFESTATION AREAS
LIGHT
FLIN FLON
CRANBERRY PORTAGE
LAKE ATHAPAPUSKOW
AMISK LAKE
GOOSE LAKE
NAMEW LAKE
WANLESS
CUMBERLAND LAKE
READER LAKE
THE PAS
0
8
SCALE

Table 2.

Summary of Permanent Plots in the Northern District of Manitoba Showing Percentage Dead Trees by Basal Area and History of Larch Sawfly Defoliation during Period shown by Tally Years

Plot No.	Tally year	Tamarack Only: d.b.h. Living trees Range	Tamarack Only: d.b.h. Living trees Average	Tamarack Only: d.b.h. Dead trees Range	Tamarack Only: d.b.h. Dead trees Average	Tamarack Only: Basal Area Living	Tamarack Only: Basal Area Dead	Tamarack Only: Basal Area % loss	Total all species Basal Area Living	Total all species Basal Area Dead	Total all species Basal Area % loss	Defoliation history of tamarack Year	Defoliation history of tamarack %	Remarks Plots established 1954
101	1954	1-5	2.24	1	1.0	6.350	.005	.08	6.355	.005	.08	1954	21	Moderately dry site in 55, 56.
												1955	0	
	1956	1-5	2.30	1-3	1.4	6.622	.069	1.04	6.627	.069	1.04	1956	1	Wet in 1954. 1956-needles short, occasional twig dead. Growth stagnated
102	1954	1-8	2.39	1-2	1.0	13.402	.042	.31	13.446	.042	.31	1954	25	Damp site, soil appears quite fertil under moss. 1956 Foliage production very scant near top of crown
												1955	8	
	1956	1-7	2.61	1-3	1.2	11.881	.178	1.49	11.925	.178	1.49	1956	1	
103	1954	1-5	2.46	1	1.0	5.914	.095	1.60	9.142	.105	1.15	1954	63	Wet site. Surface water present every year so far. 1956 foliage production late and poor especially at tree top
												1955	0	
	1956	1-5	2.51	1	1.0	5.006	.145	2.89	9.309	.145	1.55	1956	1	
105	1954	1-4	1.94	0	0	8.913	0	0	12.735	.064	.502	1954	43	Poor growing conditions, seems to be no soil at all only moss on bog, however growth increment is good. 1956needles short on tops of most trees
												1955	4	
	1956	1-4	1.75	1-2	1	6.465	.174	2.69	9.748	.179	1.84	1956	1	

Table 3.
Acres Defoliated by Spruce Budworm at Namew Lake
Northern Manitoba - 1956

Year	1953	1954	1955	1956
Acres severely defoliated	2,500	5,000	16,000	60,000* /
Per cent total foliage destroyed	40	50	50	45
Per cent current foliage destroyed	95-100	95-100	95-100	90

* No correction made for areas not containing host tree
/ Increased acreage in 1956 due partly to a newly discovered infestation at Saskoba Lake and partly to a change in method of plotting by strip flying

Air and ground inspections were made in the two infestation areas. One flight was used to fly a block of 4 mile strips during which observations and recordings were made at one minute intervals. The map made from these recordings is shown in Figure 2a. By this method, severe defoliation was recorded on white spruce on 60,000 acres. This startling increase in area is due to the fact that strip flying and recording at set intervals tends to give a distorted picutre in an area where the host tree is sparse. As a result, a few severely defoliated trees could, and very often did, give the same recording as a dense stand. The area of light infestation also increased over 1955 but budworm populations per tree appeared to be lower. The extension was mainly in the vicinity of Rocky Lake and Wanless. As in 1955, no noticeable defoliation could be detected from the air in lightly infested areas.

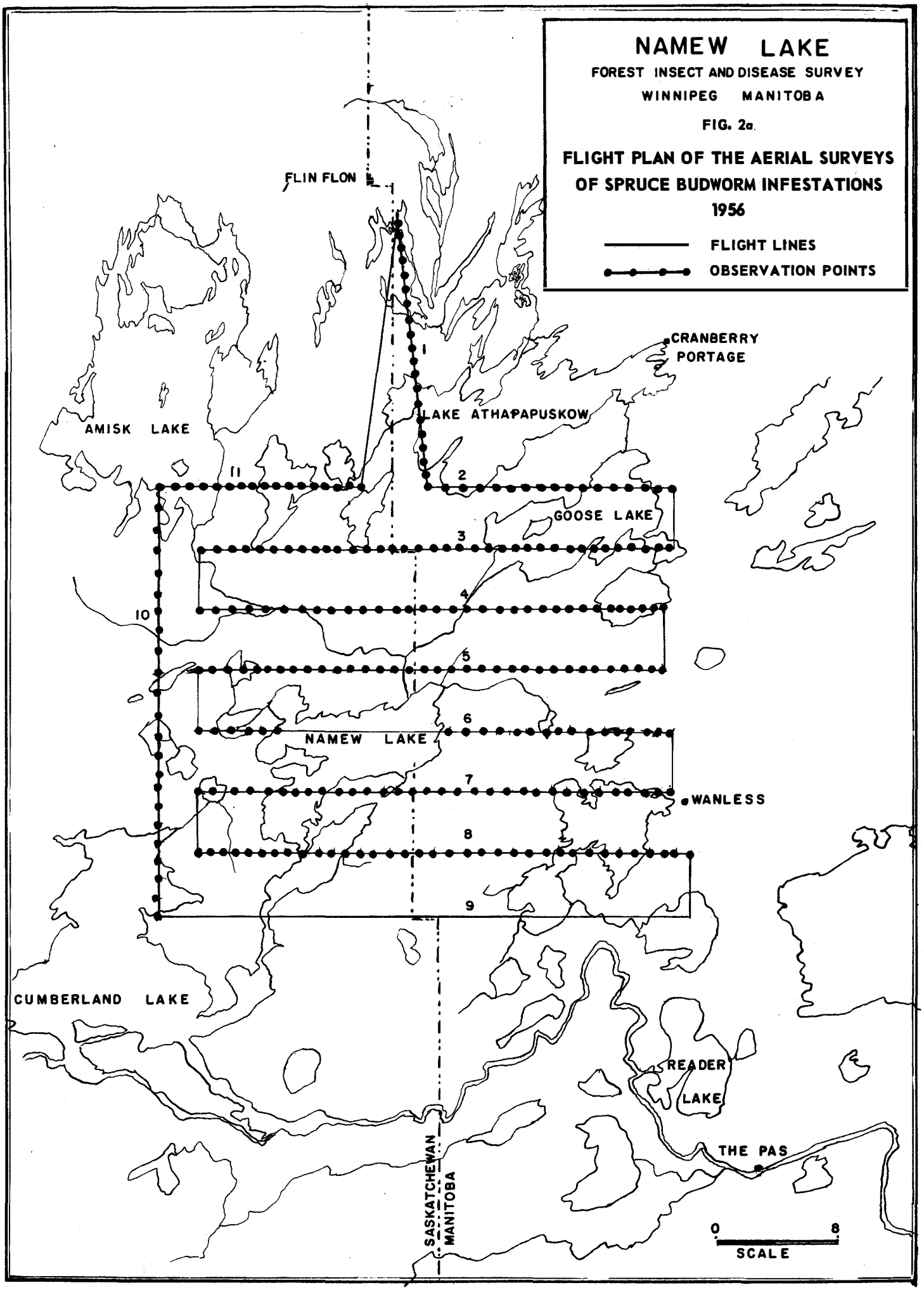
Balsam fir trees up to 8' high in the area of severe defoliation were again completely stripped of new foliage and considerable back feeding was observed on old foliage. Complete stripping of the top three feet of the crown was common on mature white spruce. Many shoots which had been previously defoliated produced no buds in 1956.

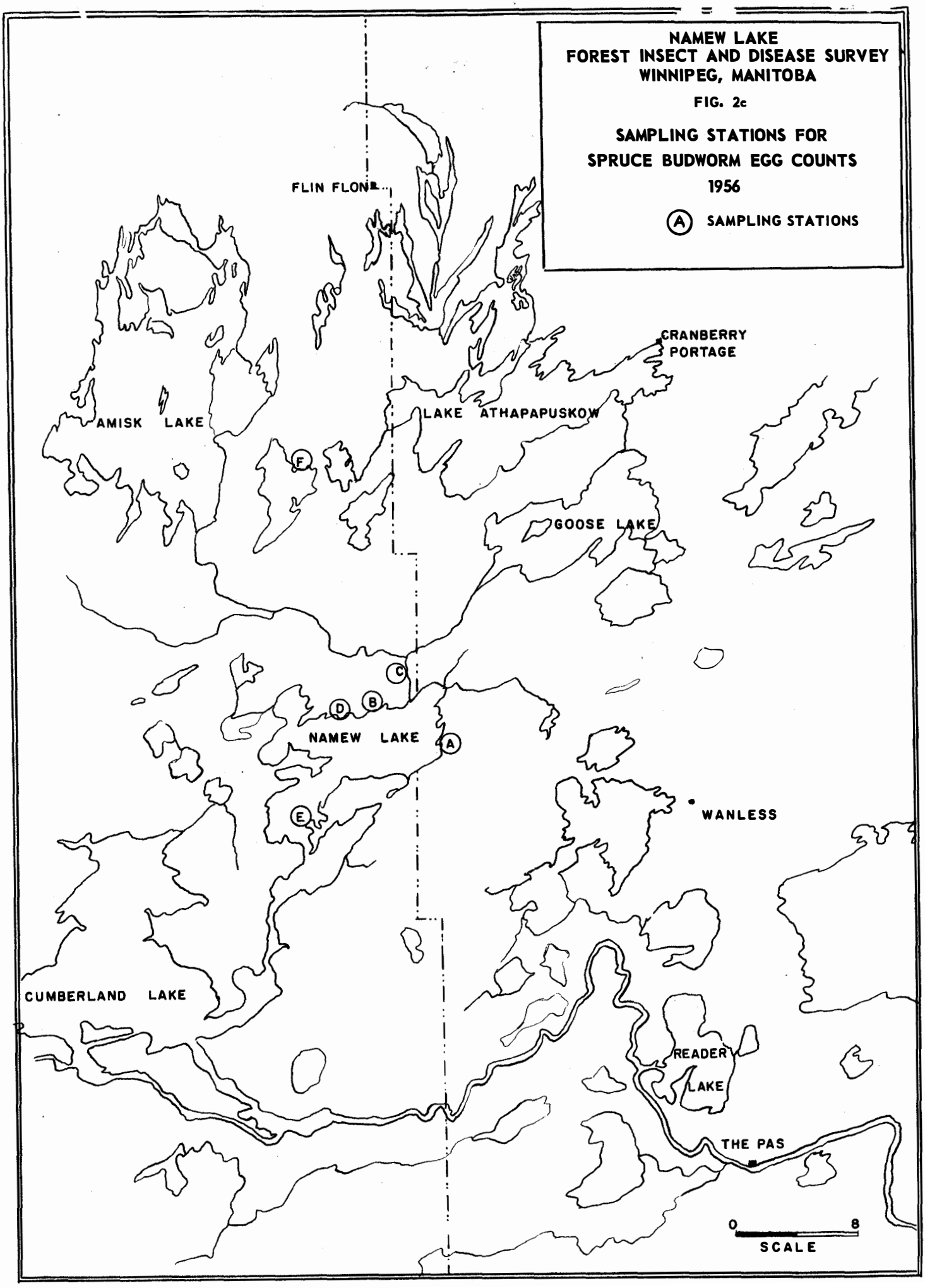
Spruce budworm egg counts were made in and around the infestation at Namew Lake, Figure 2c. The sample consisted of two 18" branch tips from the mid crown of each of five trees per sample point. Table 4 gives the egg counts on white spruce for 1956 as compared to those of the three previous years.

Table 4.
Spruce Budworm Egg-cluster Counts on White Spruce
Namew Lake Area, Manitoba

Year	Average Number of Egg Clusters per Sample Branch					
	Sample Pt. A	Sample Pt. B	Sample Pt. C	Sample Pt. D	Sample Pt. E	Sample Pt. F*
1953	5.5	1.6	1.4	0.0	0.05	--
1954	4.6	0.0	16.6	0.0	0.0	--
1955	2.8	12.4	11.0	0.0	0.0	--
1956	4.2	8.3	3.1	1.4	0.2	0.0

* Sample point "F", first sampled in 1956, is located on east shore of Maraiche Lake at a point nearest to area infested. Grid - 7-034-332, Sec. 19, tp. 63, Rge. 30, WP mer.


NAMEW LAKE
FOREST INSECT AND DISEASE SURVEY
WINNIPEG MANITOBA
FIG. 2a.
FLIGHT PLAN OF THE AERIAL SURVEYS OF SPRUCE BUDWORM INFESTATIONS 1956
FLIGHT LINES
OBSERVATION POINTS
FLIN FLON
CRANBERRY PORTAGE
LAKE ATHAPAPUSKOW
AMISK LAKE
GOOSE LAKE
NAMEW LAKE
WANLESS
CUMBERLAND LAKE
READER LAKE
THE PAS
SASKATCHEWAN
MANITOBA
SCALE
0
8
1
2
3
4
5
6
7
8
9
10
11


NAMEW LAKE
FOREST INSECT AND DISEASE SURVEY
WINNIPEG, MANITOBA
FIG. 2c
SAMPLING STATIONS FOR
SPRUCE BUDWORM EGG COUNTS
1956
A SAMPLING STATIONS
FLIN FLON
CRANBERRY PORTAGE
AMISK LAKE
LAKE ATHAPAPUSKOW
F
GOOSE LAKE
C
D
B
NAMEW LAKE
A
E
WANLESS
CUMBERLAND LAKE
READER LAKE
THE PAS
0
8
SCALE

6.3.3 Black-headed Budworm, Acleris variana Fern., and Associated Species.

Populations of the black-headed budworm decreased markedly and only light defoliation was evident in 1956. However, other insect species usually associated with it continued to damage the cones of black spruce, white spruce and balsam fir. As in previous years, damage was most conspicuous on black spruce with close growing tops. Cone borers were most common and severely damaged cones were found on practically all black spruce and balsam fir examined and on a few white spruce.

Twenty-five collections containing black-headed budworm larvae were made between the Overflowing and Churchill rivers. Over the same area, thirteen collections were made containing other associated insect species. The average number of black-headed budworm larvae in the above samples was two, with a high of eight and a low of one. No conspicuous foliage feeding was noted throughout the area and since populations of the defoliators were very low, aerial observations were of little value for mapping distribution of this species complex in 1956.

The incidence of the various insect species in the collections taken is shown in Table 5.

Table 5.
Frequency of Occurrence of Various Species
Attacking Spruce and Balsam fir
Northern Manitoba - 1956

Insect Species	Percentage of Samples Containing each Insect
Dioryctria abietella	24
Epizeuxis aemula	8
Herculia thymetusalis	36
Tortricid sp.	8
Gelechiid sp.	20
Pyralid sp.	4
Acleris variana	48

In addition to general sampling of the species complex through the district, special sampling of "club-topped" black spruce was conducted at three points in order to ascertain the species present, their abundance, defoliation and damage, and distribution within the crown. One branch was removed from each of the lower and mid crown levels and 3 branches from the upper crown level of each tree examined. Insect species were recorded by branch location and by the type of growth they were feeding on; (1) insects feeding on new foliage; (2) insects feeding on cones; (3) insects feeding on old foliage, and (4) insects for which part of tree attacked could not be determined.

The points sampled and the results of the examinations are given in Table 6.

Table 6.
Defoliation and Cone Damage Caused by a Complex of
Insect Species Attacking Black Spruce in the Northern District of Manitoba
1956

Location of Plot	Tree species	Time of Examination	Lower Crown Branch		Mid Crown Branch		Upper Crown Branch		Av.No. of cones per branch	Percentage of cones damaged
			Area (sq. in)	Per cent defol.	Area (sq. in).	Per cent defol.	Area (sq.in.)	Per cent defol.		
Prospector, Man.	bS	5 July	216	0	144	0	72	0	15	0
	bS	4 Sept.	228	0	432	0	192	0	9	0
Flin Flon, Man.	bS	4 July	432	0	576	0	144	2	32	1
	bS	12 Sept.	720	0	216	0	108	0	9	57
The Bog, Man.	bS	9 July	250	0	318	0	169	0	12	0
	bS	8 Sept.	325	0	288	0	121	0	17	23

6.3.4 Forest Tent Caterpillar, Malacosoma disstria Hbn.

Although trembling aspen was sampled throughout the entire district, only one collection of the forest tent caterpillar was made. The collection contained one larva and was made at Freshford on June 20.

6.3.5 Jack-pine Budworm, Choristoneura pinus Free.

The jack-pine budworm was not detected in samples taken from jack pine in the Northern District in 1956.

6.3.6 Large Aspen Tortrix, Choristoneura conflictana Wlk.

The large aspen tortrix caused no noticeable defoliation through the district this year. Two collections containing this species were taken; one, a pupa from aspen at Rocky Lake, and the other, 3 larvae from near Westray.

6.3.7 American Poplar Leaf Beetle, Gonioctena americana Schffr.

This leaf beetle occurred in all areas of the Northern District but caused very little defoliation except for an area of 2 square miles northeast of The Pas Airport. In this stand, small patches of trembling aspen, 1 1/2" d.b.h. and smaller, were completely stripped of foliage. The severely attacked trees comprised about 5 per cent of the total stand. The remaining 95 per cent showed light defoliation.

At Cranberry Portage, light defoliation was noted in a mixed wood stand. Two small patches of moderate defoliation were found one mile east of the town. These patches were about 5 acres in area.

Light defoliation was observed at Amisk Lake, Wanless and at the Overflowing River. A trace of defoliation occurred at Westray and Prospector. Adult leaf beetles were found near Clearwater Lake during the first week of September.

6.3.8 Gray Willow-leaf Beetle, Galerucella decora Say.

The gray willow-leaf beetle was present in all areas examined but no significant skeletonization of willow foliage was observed.

6.3.9 Yellow-headed Spruce Sawfly, Pikonema alaskensis Roh.

The yellow-headed spruce sawfly was lightly distributed throughout the Northern District in 1956, from the Overflowing River to Burntwood Lake.

The following table (Table 7) shows the occurrence of the yellow-headed spruce sawfly in collections taken from white spruce, black spruce and balsam fir in 1956.

Table 7.
Summary of Yellow-headed Spruce Sawfly Collections
Northern Manitoba - 1956

Host	Total No. of Collections	Per cent Containing Yellow-headed Spruce Sawfly
White spruce	38	5
Black spruce	22	14
Balsam fir	6	0

6.3.10 Green-headed Spruce Sawfly, Pikonema dimmockii Cress.

A decrease in numbers of the green-headed spruce sawfly was evident in 1956. It was found at six widely scattered points from Westray north to Burntwood Lake.

The following table (Table 8) summarizes the occurrence of the green-headed spruce sawfly in samples taken from black and white spruce.

Table 8.
Incidence of Green-headed Spruce Sawfly

Host	No. of Collections	Per cent containing green-headed spruce sawfly
White spruce	38	8
Black spruce	22	14

6.3.11 Pitch Nodule Maker, Petrova albicapitana Busck.

Populations of the pitch nodule maker remained at a very low level in the Northern District in 1956. Nodules were found at three locations ten miles northeast of The Pas and one location 14 miles south of Westray. Approximately 50, 5-foot trees were examined at each site. At the three sites examined northeast of The Pas, one, one and three nodules respectively were found. At the Westray site one nodule was found. Fifty trees 5 feet high were examined at Cranberry Portage, Flin Flon and Root Lake. At these locations no nodules were found.

Table 9 gives a summary of pitch nodule maker collections.

Table 9.
Summary of Collections of Pitch Nodule Maker in Northern Manitoba - 1956

Location of Sample	No. of Trees Examined	Per cent infested with pitch nodule maker
The Pas, Man., 10 mi. NE	50	2
The Pas, Man., 10 mi. NE	50	2
The Pas, Man., 10 mi. NE	50	6
Westray, Man., 14 mi. S	50	2
Cranberry Ptge. Man.	50	0
Flin Flon, Man.	50	0
Root Lake, Man.	50	0

6.3.12 A Root Weevil, Hylobius sp.

Light to moderate infestations of this weevil occurred in jack pine stands at Cranberry Portage and Prospector. In the former area, tree mortality showed a marked increase from last year and 5 of 48 trees examined were dead. At Prospector, 15 to 330 trees were dead. These stands consisted of 2 and 1000 acres respectively. The infestation on mature white spruce four miles east of Prospector continued at about the same intensity as reported in 1955. In the vicinity of Root Lake, seven per cent of the jack pine in a 1000 acre stand were dead or dying. This infestation was reported in the fall of 1955 and first examinations were carried out this year.

A survey was conducted of a white spruce stand at Wanless to determine the root damage and tree mortality caused by this weevil. Stand composition and percentage of tree mortality in the area was determined by a random pairs cruise. Weevil damage to the roots of white spruce was appraised by critical examination of the root systems of 10 sample trees. A damage index was applied to each infested root.

The stand composition and tree mortality in the Wanless area as determined by a random cruise, together with the weevil damage index are shown in tables 10 and 11.

Table 10.
Summary of Mortality Cruise by Random Pairs Method
(Wanless, Manitoba - 1956)

Northern District of Manitoba Area No. 1 Sec. 2, tp. 60, rge. 27, WP mer.

Tree Species	Dist. of Random Pairs of Diameter Class (expressed as No. of trees)								Percentage distribution by tree species	
	3 - 6.5		6.6 - 9.5		9.6 - 12.5		12.6 +			
	L	D	L	D	L	D	L	D	L	D
White spruce	44	0	13	0	2	0	2	0	43.6	0
Trembling aspen	18	4	13	0	1	0	1	0	23.6	2.9
Black spruce	30	0	4	0	0	0	0	0	24.3	0
Black poplar	3	1	3	1	0	0	0	0	4.3	1.4

No. of pairs tallied - 70
Average distance between pairs (ft.) - 8.5
Estimated stems per acre - 693

The result of this mortality cruise indicates that, in this type of stand, there is no mortality of white spruce (61 white spruce examined). As mortality was found among the aspen it may be concluded that at present, Hylobius is not causing any mortality in this stand.

Table 11.
Hylobius sp. Damage Index and Percentage Disease Roots in a Ten Tree Sample in Above Plot

Northern District of Manitoba Area No. 1. Sec. 2, tp. 60, rge. 27, WP mer.

Tree No.	d.b.h.	Tree Ht.	Hylobius damage index	Total Percentage of roots diseased	Percentage diseased roots with insect damage
1	7.1	40	1	0	0
2	6.1	38	1	0	0
3	6.4	46	3.6	25	100
4	10.8	72	4.8	25	91
5	10.3	70	3.8	10	100
6	11.5	80	2.0	6	100
7	8.8	65	2.1	0	0
8	12.2	80	1.5	0	0
9	4.5	30	0	0	0
10	7.6	45	2.9	12	100

Table 11 shows an average damage index by Hylobius of 2.1. This is light damage and may only be considered important as related to the percentage of diseased roots with insect damage. Almost 100 per cent of diseased roots had insect damage. This makes it quite probable that diseases frequently infect a tree through Hylobius scars.

6.3.13 A Leaf Miner, Gracillarid sp.

This leaf miner was found on willow from the Overflowing River north to the Churchill River and from Amisk Lake, Saskatchewan east to Burntwood Lake. It was also found on black poplar near The Pas and on trembling aspen two miles south of Cranberry Portage. However, no damage was observed on these species. The intensity of infestation on willow at various points throughout the district is shown in Table 12.

Table 12.
Gracillarid Damage on Willow

Location	Infestation Intensity	Location	Infestation Intensity
Grace Lake	trace	Goose Lake	M to S
Burntwood Lake	trace	Egg Lake	M to S
Overflowing River	trace	Atik	M to S
Denare Beach	L - M	Wanless	M to S
Amisk Lake	L - M		

L - light; M - moderate; S - severe

6.3.14 The Aspen Blotch Miner, Lithocolletis salicifoliella.

This blotch miner of trembling aspen was found 8 miles west of Baker's Narrows, at Aimee Lake and at the southwest end of Simonhouse Lake. Only at Simonhouse Lake was there any significant browning of foliage. Eighty per cent of the leaves on aspen regeneration were blotched over an area of ten acres that had been recently cut over for sawlogs and pulpwood.

6.3.15 Other Noteworthy Insects.

Table 13lists several insects which were found in the Northern District. While considered worth noting, they were not causing any important defoliation or damage in 1956.

Table 13.
Other Noteworthy Insects

Species	No. of Collections	Remarks
Balsam-fir Sawfly, Neodiprion abietis Harr.	0	Populations low in 1955. Not found on spruce in 1956.
Birch skeletonizer, Bucculatrix canadensisella Chamb.	0	Frequently found on white birch in 1955; not found in 1956
Maple Leaf Miner, Gracilaria negundella	1	One larva found 16 miles west of The Pas. No damage detected on maple
Mourning Cloak Butterfly, Nymphalis antiopa (L).	2	Colonies found at The Pas Airport and at Highrock Lake. Defoliation confined to one willow bush in each instance
Spotless Fall Webworm, Hyphantria textor, Harr.	3	Webs were seen on cherry, willow and birch at The Pas Airport. One web was found on willow at Rocky Lake. No signification defoliation was found
Poplar Vagabond Gall Aphid, Mordwilkoja vagabunda	1	One gall only was found on tA near Atikameg Lake
Ugly Nest Tortrix, Archips cerasivorana Fitch.	7	Found lightly scattered from Westray to Rocky Lake. Tents were found in groups of 3-5. Six samples were taken from cherry and one from tA. No signification defoliation was found.

Table 13 continued

Species	No. of Collections	Remarks
A Webworm, Tetralopha asperatella	6	Light populations were found on tA from Overflowing River to Cranberry Portage. Only very light defoliation was recorded
The Western Tent Caterpillar, Malacosoma pluvialis Dyar.	1	Found on willow at Amisk Lake. Caused no appreciable defoliation

6.4 TREE DISEASE CONDITIONS

6.4.1 Mistletoe on Jack pine, Arceuthobium americanum.

The jack-pine mistletoe continued to infect stands of jack pine in Northern Manitoba but no changes were seen in the infestation level. Stands were examined in the Turnerberry, The Pas and Atikameg Lake areas. As the accessible areas were sampled in 1955, no samples of this parasite were taken in 1956.

Examinations of the mistletoe plants were made for the parasite fungus, Walrothiella arceuthobii, but it was not found in 1956.

6.4.2 Black Knot of Chokecherry, Dibotryon morbosum.

Black knot was found to be present again at Big Eddy where negligible damage was noted on a few chokecherry bushes. One specimens was also taken from a cherry branch near Atikameg Siding.

6.4.3 Globose Rust Gall of Jack Pine, Cronartium sp.

No change was observed in the status of this disease in 1956. Galls were found near Westray, The Pas, Cranberry Portage and Flin Flon.

6.4.4 Spruce Needle Rust, Chrysomyxa sp.

This rust caused widespread discoloration of spruce foliage in 1954, decreased sharply in 1955 and decreased still further in 1956. Damage was negligible this year and samples were taken near Grace and Kipakagan lakes.

6.4.5 Chlorosis of White Spruce.

Near Grace Lake, three small spruce were observed which had lost most of their colour. The damage was described as chlorosis.

Fig.3

Dwarf Mistletoe Brooms on Jack Pine Caused by Arceuthobium americanum. The Pas, Man.
Photograph by J.B. Martin.
Negative Number W-84

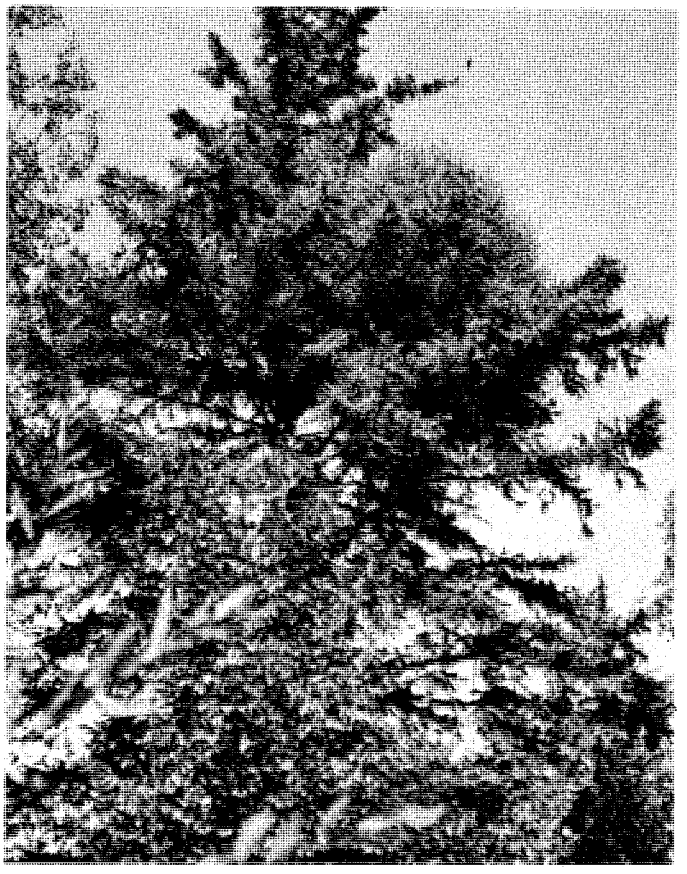


Fig.4

Dwarf Mistletoe Brooms on Black Spruce
Caused by Arceuthobium pussillum.
The Pas, Man.
Photograph by J.B. Martin.
Negative Number W-481

6.4.6 Shoestring Root Rot, Armillaria mellea.

This fungus was killing about five per cent of the jack pine reproduction 9 miles northeast of The Pas. The stand consisted of about 300 acres of reproduction ranging from 3 to 8 feet in height. Stands of jack pine near Westray and Wanless were observed where the regeneration was about 3 per cent infected by the shoestring root rot.

A stand of jack pine, 20 to 25 years old, was examined near Prospector and no root rot was detected, but one small balsam fir nearby was dying from an attack by this fungus.

6.4.7 Needle Cast of Spruce.

One sample of needle cast of spruce was found near Sturgeon Landing on Namew Lake. Only one infected twig was observed.

6.4.8 Needle Cast of Balsam fir.

Balsam fir regeneration growing under a spruce cover was infected by needle cast on Atikameg Lake. The stand consisted of about 40 acres. Ten per-cent of the trees had at least one branch diseased.

6.4.9 Miscellaneous Diseases Noted.

Table 14.

Location	Host	Symptom	Disease
Prospector	Balsam fir	Mushroom	Cortinarius sp.
Rocky Lake	Unknown	Mushroom	Cortinarius sp.
Orok	Trembling aspen	Canker	Cytospora chrysosperma
Root Lake	W. birch	Conk	Fomes fomentarius
Root Lake	Trembling aspen	Conk	Fomes pinicola
Atikameg Lake	Jack pine	Stain	Fungal stain

6.4.10 Mechanical Injury.

Many stem scars were seen on a stand of 4 inch trembling aspen near Orok. The stand was about 40 acres in area. The scars were identified as mechanical injury.

One white birch at Nokomis Lake was noted with the top quarter of the crown dead. This also was identified as mechanical injury.

6.5 SPECIAL PROJECTS

6.5.1 Phenological Studies.

Phenological studies were carried out on jack pine, white spruce, tamarack and trembling aspen. Shoots were marked and measured when growth was half complete and again when growth for the season had ceased. These studies were made on three plots in the Northern District. The locations of sample plots are shown in Table 15.

Table 15.
Phenological Sample Plots Northern District

Plot No.	Location	Grid
1	The Pas Airport	7-042-323
2	Cranberry Portage	7-040-334
3	Bakers Narrows	7-037-336

Annual phenological records will be kept for these plots to show annual variations in development of host trees in different areas of the two provinces.

6.5.2 Special Collections.

The following table summarizes the special collections made in 1956.

Table 16.

Type and purpose of collection	No. of Collections	Time spent on collection
Spruce budworm larvae for Dr. Stehr, Sault Ste. Marie	1	1 day
Spruce budworm larvae for R. J. Heron, Winnipeg	1	1 day
18" spruce branches for Winnipeg Survey	6	2 days
Complete sampling of black spruce complex, Winnipeg Survey	3	1 day
Sequential sampling of larch sawfly egg scars, Winnipeg Survey	4	2 days
Aphid collections for Mr. G. A. Bradley, Indian Head, Sask.	7	2 days
Mass collection of balsam-fir needle cast for H. Zalasky Saskatoon, Saskatchewan	1	1/2 day
Seed collections for Dr. O. Vaartja, Saskatoon, Sask.	3	2 days

6.6 SUMMARY OF INSECT AND DISEASE COLLECTIONS

The number of insect and tree disease collections taken in 1956 in the Northern District of Manitoba from the principal tree species are shown in Table 17.

Table 17.
Summary of Insect and Disease Collections

Host Tree	No. of Insect Samples	No. of Disease Samples
Trembling aspen	42	3
Black poplar	12	
Tamarack	26	1
Willow	22	
White spruce	38	1
Black spruce	22	3
White birch	15	3
Balsam fir	6	5
Jack pine	16	5
Elm	1	
Manitoba maple	4	
Cherry	5	2
Saskatoon	1	2
Alder	3	
Ash	1	
Miscellaneous	4	
Unknown	0	1
TOTALS	218	26

6.7 PERSONNEL CONTACTED

A list of the persons contacted during the season is given in Table 18. The contacts were made primarily to acquaint forest service personnel and private woods operators with forest insect and tree disease problems throughout the district and to obtain assistance in carrying out surveys of inaccessible areas.

Table 18.

Name	Address	Title	Service	No. of Contacts
C. Patterson	The Pas	Dist. Forester	M.F.S.	4
R. Ross	The Pas	Chief Ranger	M.F.S.	3
W. C. McLean	The Pas	Dist. Engineer	M.F.S.	5
W. Shipley	The Pas	Forest Ranger	M.F.S.	4
R. Cooper	Cranberry Ptge.	Forest Ranger	M.F.S.	2
J. Richenholler	Cranberry Ptge.	Forest Ranger	M.F.S.	4
A. Moens	Cranberry Ptge.	Fire Ranger	M.F.S.	4
L. Bryce	Flin Flon	Field Officer	D.N.R.	2
W. Erlendson	Channing	Forest Ranger	M.F.S.	5
C. Smith	Sherridon	Forest Ranger	M.F.S.	1
E. Smith	The Pas	Fire Ranger	M.F.S.	3
R. Smith	Cranberry Ptge.	Fire Ranger	M.F.S.	4
S. Zayak	The Pas	Woods Operator	Private	3
J. Lepchuk	Cranberry Ptge.	Woods Operator	Private	3
W. Presloski	Mafeking	Forest Ranger	M.F.S.	1
E. Clarkson	The Pas	Fire Ranger	M.F.S.	6

7. ANNUAL REPORT OF FOREST BIOLOGY RANGER

HUDSON BAY DISTRICT OF SASKATCHEWAN

1956

by

R. H. M. Pratt

INTERIM REPORT - 1956

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

February, 1957

7.1 INTRODUCTION

During 1956, forest insect and tree disease surveys were conducted throughout the Hudson Bay District of Saskatchewan from the middle of May until the last week of September. All accessible forested areas were examined and sampled, major insect and tree disease outbreaks were mapped and the abundance of minor insect species and tree diseases were recorded.

Throughout August and September, boundary lines of all permanent tamarack plots in the Hudson Bay District were re-cut and trees were retallied.

Approximately 3 1/2 hours of aircraft travel were supplied by the Saskatchewan Department of Natural Resources, which made it possible to survey areas otherwise inaccessible. The assistance and co-operations received from personnel of the Department of Natural Resources are gratefully acknowledged.

7.2 REVIEW OF FOREST INSECTS AND TREE DISEASES

A noticeable increase in the populations of the large aspen tortrix and the leaf roller, Sciaphila duplex was seen on trembling aspen stands throughout the Hudson Bay District. Larch sawfly populations declined again this year and most tamarack stands were completely free of any defoliation.

Populations of the yellow-headed spruce sawfly declined in white spruce shelterbelts and on ornamental spruce plantings. Damage to native spruce by the yellow-headed spruce sawfly was also very light.

There was no appreciable change in the spruce budworm and jack-pine budworm populations. Samples of these insects were collected from many widely scattered points in the Hudson Bay District.

The diseases of trembling aspen, Hypoxylon pruinatum, Radulum casearium, and Polyphorus pargamenus were commonly found throughout the Hudson Bay District. A number of native black and white spruce seedling beds were examined during the summer for a soil inhabiting fungus, which causes the damping off of one and two year old spruce seedlings. This diseases was not found in the Hudson Bay District during the 1956 field season.

7.3 INSECT CONDITIONS

7.3.1 Larch Sawfly, Pristiphora erichsonii (Htg.).

All tamarack stands throughout the Hudson Bay District were examined and sampled to determine the extent of larch sawfly infestations.

Very light defoliation was noted on scattered tamarack in the Madge Lake area of the Duck Mountain Provincial Forest. Larch sawfly infestations were light along the southern slopes of the Porcupine Provincial Forest north of Pelly. Very little sawfly defoliation occurred in this area.

Light populations of the larch sawfly, accompanied by little or no defoliation, were common throughout all pure and mixed tamarack stands in the Porcupine Provincial Forest. Light larch sawfly populations and very light defoliation was noted in all tamarack stands in the Northern Provincial Forest.

A few larch sawfly samples were found east of Carrot River along the road leading to Summit Tower. Sawfly larvae were found only on trees in the 1-and 2-inch d.b.h. class. Larger tamarack trees in the Summit Tower area were noticeably free from sawfly defoliation.

All tamarack stands were sampled northeast of White Fox along the Flin Flon Highway as far as tp. 54, rge. 10, W2 mer. Light larch sawfly populations and little or no defoliation were noted. Moderately good shoot growth and fairly heavy needle production were recorded in this area.

South of Tisdale scattered tamarack along Highway 35 were checked for larch sawfly defoliation. Very light populations were found in this area.

A further decline in sawfly populations was apparent throughout the Hudson Bay District. Larval populations were much lighter than in previous years, resulting in little or no defoliation of tamarack. Figure 1 shows defoliation and distribution of the larch sawfly as determined by ground and aerial surveys.

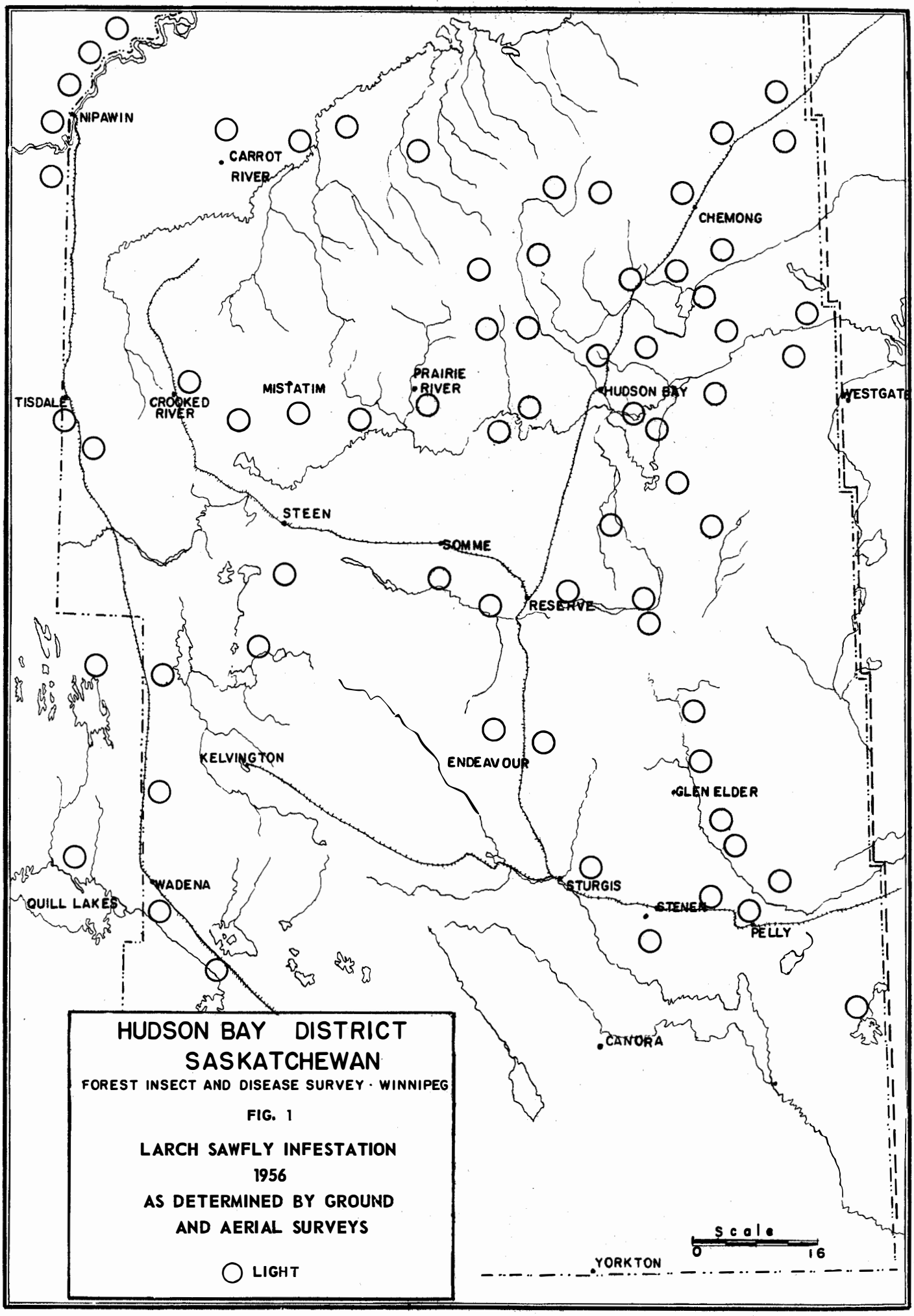
For the first time in the Hudson Bay District a sequential sampling method was used to accurately determine larch sawfly populations and defoliation. Six widely spaced permanent sample plots were selected throughout the district. In each plot two branches were cut from the mid crown of each of five sample trees, the cumulative infested and none infested shoot terminals were counted and recorded until the degree of infestation was established. The results of this system are shown in Table 1.

Table 1.

Larch Sawfly Defoliation
(Results based on sequential sampling system)

Plot No.	Place	Sec.	tp.	rge.	mer.	No. of shoots examined	No. of curled tips	Infestation rating
101	Armit Road	12	44	2	W2	50	nil	light
103	Armit Road		44	31	WP	60	1	"
105	Greenbush	21	45	5	W2	60	1	"
106	Pelly	15	34	32	WP	50	nil	"
108	Bjorkdale	12	43	3	W2	50	nil	"
110	Otosquen	35	48	2	W2	50	nil	"

Six tamarack plots were established in 1949 and one in 1954 in the Hudson Bay District for the purpose of studying tamarack mortality caused by repeated larch sawfly attacks. The plots ranged in size from 1/10 to 1/2 acre. All living and dead trees were recorded and the annual defoliation records were maintained for each plot. These plots were retallied in 1956 in order to determine tree mortality. The percentage of loss by basal area together with defoliation records are shown in Table 2.



HUDSON BAY DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY · WINNIPEG

FIG. 1

LARCH SAWFLY INFESTATION
1956
AS DETERMINED BY GROUND
AND AERIAL SURVEYS

○ LIGHT

Table 2.

Summary of Permanent Tamarack plots in the Hudson Bay District of Saskatchewn Showing Percentage of Dead Trees by Basal Area and History of Larch Sawfly Defoliation during Period shown by Tally Years (Percentage Wood Loss Being the Cumulative Mortality)

Plot No.	Tally year	Tamarack only d.b.h. Living trees Range	Tamarack only d.b.h. Living trees Average	Tamarack only d.b.h. Dead trees Range	Tamarack only d.b.h. Dead trees Average	Basal area sq. ft. Living	Basal area sq. ft. Dead	Basal area sq. ft. % loss	Total all species Basal area Living	Total all species Basal area Dead	Total all species Basal area % loss	Defoliation history of tamarack Year	Defoliation history of tamarack %	Remarks
101	1949	1-8	2.409	1-7	3.357	11.592	1.179	9.23	14.016	1.550	9.96	1949	80	
												1950	75	Undisturbed-healthy stand, ground usually wet.
												1951	35	
												1952	10 -nil	
	1956	1-8	2.732	1-4	1.686	12.833	1.509	10.521	16.561	1.509	8.35	1953	L -nil	Dense stand, small trees dying out
												1954	L -nil	
												1955	L -nil	
												1956	L -nil	
102	1949	1-3	1.524	0	0	2.362	0	0	2.688	.030	1.12	1949	60	
												1950	25	Disturbed-young stand, cut out in 1955 to make way for road allowance. Plot abandoned
												1951	nil -10	
												1952	10	
	1954	1-4	1.619	0	0	3.877	.022	.56	3.877	.022	.56	1953	nil	
												1954	nil	
												1955	nil	
												1956	nil	
103	1950	1-8	3.282	1-3	1.142	20.326	.343	1.659	29.804	1.639	5.21	1949	95	
												1950	95-100	Poor site, less than 20% tL.
												1951	50	
	1956	1-8	3.443	1-6	1.915	13.693	2.916	17.559	24.843	3.030	10.873	1952	37	Inaccessible through most of summer. Undistrubed.
												1953	28	
												1954	light	
												1955	nil	
												1956	nil	

Table 2 continued

Plot No.	Tally year	Tamarack only d.b.h. Living Trees Range	Tamarack only d.b.h. Living Trees Average	Tamarack only d.b.h. Dead Trees Range	Tamarack only d.b.h. Dead Trees Average	Basal area sq. ft. Living	Basal area sq. ft. Dead	Basal area sq. ft. % loss	Total all species Basal area Living	Total all species Basal area Dead	Total all species Basal area % loss	Defoliation history of tamarack Year	Defoliation history of tamarack %	Remarks
104	1950	2-10	5.742	1-3	1.937	28.959	.365	1.24	31.900	.452	1.40	1950	99	This stand flooded out during the past four years. All tL dead and dry. Plot will be discontinued.
												1951	80	
												1952	75	
	1954	2-10	6.346	1-9	5.484	11.382	16.465	59.126	All trees dead in 1956			1953	40	
												1954	10	
												1955	dying out	
	1956	nil	nil	1-10			all	100%			100%	1956	all dead	
106	1949	1-9	2.181	1	1	10.687	.074	0.69	11.385	.074	0.64	1949	100	Disturbed-dry forest floor. Sometimes used as a pasture. Private property.
												1950	90	
												1951	70	
												1952	10	
	1956	1-9	2.409	1-3	1.333	10.709	.842	7.289	13.609	.842	5.83	1953	13	
												1954	nil	
												1955	nil	
												1956	nil	
107	1949	1-8	3.626	1-5	2.648	27.129	1.667	5.788	29.687	1.667	5.316	1949	46	Undisturbed-this tL stand always saturated, fairly dense stand, fair needle & tip growth during past 3 yrs.
												1950	70	
												1951	67	
												1952	no record	
	1953	1-8	3.538	1-5	2.505	27.488	3.495	11.28	31.485	3.782	10.72	1953	no record	
												1954	nil-L	
												1955	nil-L	
												1956	nil-L	
108	1954	1-8	3.763	1-2	1.117	8.861	.119	1.325	8.861	.119	1.325	1954	L-nil	Undisturbed-ground always saturated, fair to long needle growth for past 4 years
												1955	L-nil	
												1956	L-nil	
	1956	1-9	3.5	1-3	1.157	6.788	.190	2.722	6.798	.190	2.718			

7.3.2 Large Aspen Tortrix, Choristoneura conflictana (Wlk.).

Stands of trembling aspen in three areas showed severe defoliation by this species. Elsewhere in the Hudson Bay District populations of the large aspen tortrix were light, and the defoliation of trembling aspen stands was hardly noticeable.

Aspen stands southwest of the town of Kelvington were severely defoliated. The heaviest concentration of aspen tortrix in this area was seen in sections 5, 6, 7, and 8, tp. 37, rge. 12, W2nd Mer., where aspen stands were almost completely defoliated. Moderate to severe defoliation was also noticed immediately surrounding these sections. The infestation appeared to taper off sharply in all cardinal directions.

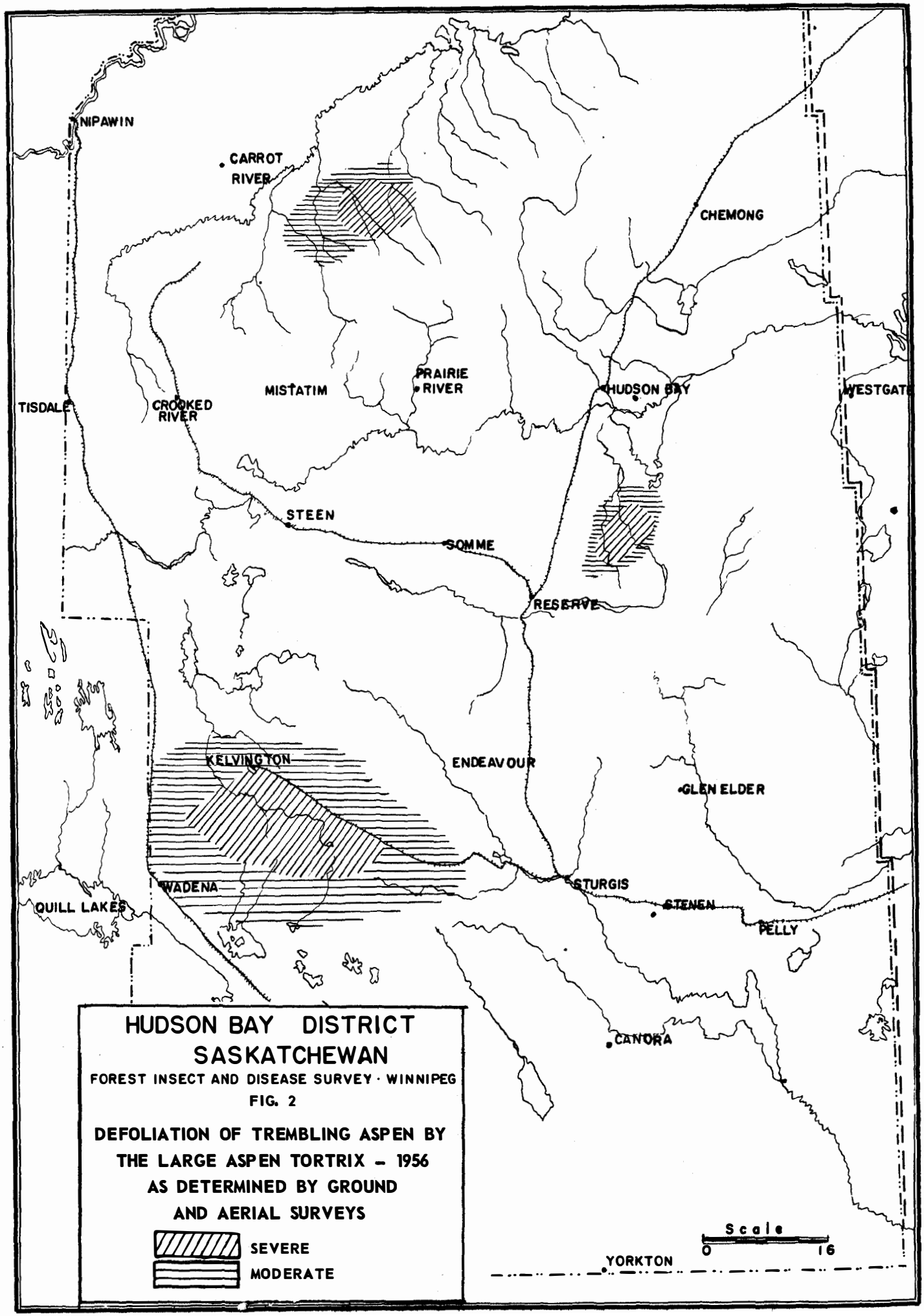
During the third week in June, the southwest area of the Hudson Bay District was resurveyed. Moderate defoliation was noted in the Canora, Invermay, Margo and Wadena areas. At that time the adult moths had begun to emerge and very heavy flights were seen throughout this area. Weather conditions appeared to be ideal for the moth flight and egg laying period and this infestation could possibly increase in area and intensity in 1957.

A complex of insect species attacking trembling aspen caused considerable damage east of Carrot River in the Summit Tower area (tp. 50, rge. 7, W2 mer.). The insects occurred in the following order of abundance and importance: Aspen tortrix, American poplar leaf beetle, and two species of leaf rollers, Epinotia nisella criddleana, and Epinotia solandriana. Cumulative feeding by these species caused 50 to 70 per cent defoliation of trembling aspen in this area.

Trembling aspen stands northeast of Bertwell in tp. 42, rges. 3 and 4, were also moderately defoliated by the combined feeding of the large aspen tortrix and three leaf rollers, Epinotia nisella criddleana, E. solandriana, and Sciaphila duplex. These leaf rollers destroy a large percentage of aspen foliage by rolling a tight leaf cover for protection while in the pupal stage. The infestation at Bertwell was small in area and most heavily concentrated in tp. 42, rge. 4, W2nd mer. Figure 2 shows the distribution, boundaries, and intensity of the large aspen tortrix and associated species in the Hudson Bay District in 1956.

7.3.3 Jack-pine Budworm, Choristoneura pinus Free.

The jack-pine budworm was found in two areas of the Hudson Bay District. Two collections were taken northeast of White Fox in tp. 53, rge. 13, W.2 mer. Five collections of the jack-pine budworm were found southeast of Hudson Bay in tp. 44, rges. 2 and 3, W2mer. In both areas populations were very light and no defoliation noticed.



HUDSON BAY DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY · WINNIPEG

FIG. 2

DEFOLIATION OF TREMBLING ASPEN BY THE LARGE ASPEN TORTRIX – 1956 AS DETERMINED BY GROUND AND AERIAL SURVEYS

SEVERE

MODERATE

Fig.3

Defoliation of Trembling Aspen by
Choristoneura conflictana.
Kelvington, Sask.
Photograph by K. Mortensen.
Negative Number W-499

7.3.4 Spruce Budworm, Choristoneura fumiferana (Clem.).

Nine scattered samples of this insect were taken during the month of June. Although no apparent defoliation resulted from light populations of the budworm, the insect was found on more spruce stands this year than in the past four years. This indicates a gradually increasing population in the District. Areas where the spruce budworm were found during 1956 are listed in Table 3.

Table 3.

Spruce Budworm Collections, Hudson Bay District
1956

Area	Tp.	Rge.	Mer.	Remarks
Greenbush	45	5	W-2	light populations
13 mile tower	46	5	"	" "
Clemenceau	42	4	"	" "
Flin Flon Highway	53	12	"	" "
NE of White Fox	54	13	"	" "
Chemong	48	2	"	" "

7.3.5 Gray Willow-leaf Beetle, Galerucella decora (Say).

A very severe infestation of the gray willow-leaf beetle was noted this year on all soft leafed willows throughout the District.

Severe skeletonizing of willow foliage occurred in the Made Lake, Pelly and Sturgis areas. It was also quite noticeable throughout the Porcupine and Northern Provincial Forests. Areas where severe willow skeletonizing was seen are listed in the following table.

Table 4.

Infestation Ratings of the Gray Willow-leaf Beetle in Representative Areas of the Hudson Bay District, 1956

Location	Degree of Infestation	Host
Yorkton	very heavy	Willows
Wadena	" "	"
Madge Lake	" "	"
Pelly	heavy	"
McBride Lake	"	"
Armit	"	"
Otosquen	"	"
Greenwater	"	"
Prairie River	very heavy	"
Nipawin	" "	"
White Fox	" "	"

7.3.6 Pine Tortoise Scale, Toumeyella numismaticum (Pettit & McD.).

This insect caused little or no damage to jack pine but three collections were made at Nipawin in tp. 44, rge. 3, W2 mer.

7.3.7 Forest Tent Caterpillar, Malacosoma disstria (Hbn.).

For the first time in four years, larvae of the forest tent caterpillar were not found in the Hudson Bay District.

7.3.8 Pitch Nodule Maker, Petrova albicapitana (Busck.).

Several small collections of this insect were found throughout all immature jack pine stands. The more mature jack pine were less susceptible to attack by this insect.

7.3.9 American Poplar Leaf Beetle, Gonioctena americana (Schaeffr.).

For the past 7 years the American poplar leaf beetle has been found on most trembling aspen stands in the Hudson Bay District. This insect is usually found feeding on immature trembling aspen foliage during the second and third week in June. Due to the short feeding period and light populations, defoliation was generally not conspicuous. However in 1956, moderate to severe poplar leaf beetle defoliation was noted north of Bertwell in tp. 42, rge. 4, W2 mer. Examinations indicated that high populations caused moderate to severe defoliation to trembling aspen reproduction over an area of approximately one square mile.

7.3.10 Balsam-fir Sawfly, Neodiprion abietis (Harr.).

Five widely scattered collections of the balsam-fir sawfly were found on white spruce in the Hudson Bay District. In all cases defoliation was negligible.

7.3.11 Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.).

Light populations of the yellow-headed spruce sawfly were noticed this year on ornamental plantings, shelterbelts, and native white spruce stands throughout the Hudson Bay District. Spruce shelterbelts in the Etomami area, which had been heavily infested by the sawfly from 1953 to 1955, were free from defoliation this year. Very light populations of the insect were found on all spruce shelterbelts throughout the agricultural areas of the District. Light populations were also evident in the forested areas of the Duck Mountain, Porcupine and Northern Provincial forests.

7.3.12 Green-headed Spruce Sawfly, Pikonema dimmockii (Cress.).

Nine samples of this insect were collected on white spruce stands throughout the District in 1956. In all cases, populations were low and defoliation of white spruce negligible.

7.3.13 Black-headed Budworm, Acleris variana (Fern.).

Several small samples of the black-headed budworm were found on white spruce stands throughout the district. Populations appeared to remain static, and in general, coincided with last years very light infestation. For example, a five tree beating sample would generally yield from three to five larvae. Areas where black-headed budworm samples were found are listed in Table 5.

Table 5.

Locations of Black-headed Budworm Collections
in the Hudson Bay District, 1956, All Infestations Light

Area	Tp.	Rge.	Mer.
Greenbush	45	5	W-2
13 Mile Tower	47	5	W-2
Clemenceau	42	5	W-2
Saginas Lake	41	2	W-2
Bertwell	41	4	W-2
Dillabough	41	6	W-2
Somme	41	7	W-2
Armit Road	44	30	W-P
Madge Lake	30	30	W-P
Greenwater	41	11	W-2
Chemong	49	1	W-2
Preeceville	34	5	W-2

7.3.14 Spruce Pineapple Gall Aphid, Chermes abietis (L.).

Evidence of this spruce gall aphid was seen throughout all spruce stands in the district. Galls were found on both black and white spruce but were generally more common on immature trees.

7.3.15 Ugly Nest Tortrix, Archips cerasivorana (Fitch.).

The ugly nest tortrix severely defoliated chokecherry, Saskatoon, and rose bushes along roadsides and cultivated fields. Despite the severe defoliation, a heavy berry crop was produced this year. Only light populations of the ugly nest tortrix occurred in the heavily forested areas.

7.3.16 White-pine Weevil, Pissodes strobi (Peck).

Nine widely scattered samples of the white-pine weevil were found on spruce and jack pine in the district. Damage was mainly confined to regeneration and reproduction trees.

Four samples of the white-pine weevil were taken from white spruce in the Armit area. Destroyed leaders of a few jack pine regeneration were seen 4 1/2 miles north of Veillardville in tp. 46, rge. 4, W2 mer. This insect also attacked similar trees northeast of White Fox in tps. 52 and 53, rges. 12 and 13, W2 mer.

7.3.17 Aspen Blotch Miner, Lithocolletis salicifoliella (Chamb.).

This insect was active on the foliage of most regeneration aspen. Conspicuous discoloration, caused by the aspen blotch miner was observed at Madge Lake in the Duck Mountains, and to a lesser extent in the Porcupine and Northern Provincial forests. This insect was not noticed in the more mature trembling aspen stands.

7.3.18 Poplar Vagabond Gall Aphid, Mordwilkoja vagabunda (Walsh.).

Deformed leaf clusters, caused by the poplar vagabond gall aphid, were found on some regeneration of trembling aspen. These samples were found mainly along the fringe of forested areas in the Hudson Bay District. Although widely distributed, the gall aphid caused only light damage.

7.3.19 Species Complex of Black and White Spruce.

Surveys of black and white spruce stands were carried out in the Hudson Bay District during August and September. Particular attention was paid to "clubbed top" black spruce infested with a complex of insect species. Most of the activity by this complex was observed from the second week of August and continued into the third week of September, when the pupation of most insect species had taken place.

The survey of clubbed top black spruce showed this condition was common throughout black spruce stands in the district. In all instances the insects were restricted to the top 2 1/2 feet of the crown. Defoliation was generally light and no distinct top browning as reported in other forested areas was found in the Hudson Bay District. The insects most commonly found are listed in Table 6.

Table 6.

Species Complex of Black and White Spruces

Insect Species	Remarks
Snout moth, Herculia thymetusalis	Commonly found in "clubbed top" bS
Cone worm, Dioryctria abietella	Commonly found in "clubbed top" bS
Leaf roller, Archips alberta	Commonly found in "clubbed top" bS
Micro moth, Gelechiid sp.	Commonly found in "clubbed top" bS
Owlet moth, Epizeuxis aemula	Found on bS but not common
Strawberry root weevil, Brachyrhinus ovatus	Found on bS but not common

Considerable cone damage was observed on the trees infested with this complex of species, but it was not possible to determine the species responsible. In some areas 15 to 40 per cent of the current cone crop was entirely destroyed.

Table 7 lists the areas from which infestations in black spruce tops were noted in 1956.

Table 7.

Cone Damage to Black Spruce in the Hudson Bay District

Area	Intensity of Infestation	Percentage of black spruce attacked by the species complex	Per cent cone damage
Armit	light	10 to 15	20
Otosquen	light to moderate	15 to 30	25
Greenbush	light	15	20
Chelan	light	15 to 20	25
Washee	light to moderate	15 to 30	35
Ceba	light	15	15
NE of White Fox	light to moderate	15 to 35	15

7.3.20 A Root Weevil, Hypomolyx spp.

Larvae and adults of a root weevil, Hypomolyx spp. were found on immature, mature, and overmature white and black spruce stands throughout the Hudson Bay District. Collections were taken from the roots and in the duff around the base of spruce trees. Hypomolyx damage was usually confined to spruce growing on wet sites. Spruce growing on dry areas appeared to be less susceptible to root weevil attack. Areas where this insect was found are listed in Table 8.

Table 8.

Areas Where Hypomolyx spp. Collections Were Made

Host	Area	Tp.	Rge.	Mer.	Remarks
W. spruce	Fir River	48	5	W2	Moderate damage to roots
W. spruce	Armit area	44	31	W2	Moderate damage to roots
W. spruce	Usherville	37	5	W2	Moderate damage to roots
W. spruce	McBride Lake	40	5	W2	Light damage to roots
W. spruce	Chemong	49	1	W2	Slight damage
W. spruce	Ushta	38	5	W2	Light damage
W. spruce	Piewi Tower	40	7	W2	Light damage
W. spruce	Bertwell	42	3	W2	Light damage

During the third week of September, a random pairs cruise was made south of Hudson Bay in the Porcupine Provincial Forest (tp. 42, rge. 4, W2 mer.). A mature spruce and aspen stand was selected in an effort to determine tree mortality and to assess the damage done to spruce by the root weevil Hypomolyx sp. This work was directed by G. L. Warren of the Winnipeg Laboratory. To estimate the mortality in this area, 70 pairs including all tree species in this

stand were tallied. The following table summarizes the tree species and mortality found in this area.

Table 9.

Tree Mortality in a Typical White Spruce Stand
Hudson Bay District

Tree species	Mortality Range by Diameter Class								Percentage of tree species	
	3 - 6.5		6.6 - 9.5		9.6 - 12.5		12.6 +			
	L	D	L	D	L	D	L	D	L	D
W. spruce	7	0	6	0	11	0	43	0	47.85	0
T. aspen	6	0	19	4	23	1	5	4	37.35	6.33
B. poplar	1	0	3	0	5	0	3	0	8.47	0

The upper roots of 10 representative white spruce trees were exposed and critically examined for Hypomolyx damage, using a system devised by Warren*. Table 10 summarizes the damage index of the 10 sample trees in the plot.

Table 10.

Hypomolyx Damage Index on Ten White Spruce Trees within
the Random Pair Cruise Area

Tree No.	d.b.h.	No. of roots examined	No. of roots attacked	Damage Index
1	9.7	8	nil	0
2	8.5	10	nil	0
3	12.7	14	3	0.4
4	19.0	19	13	3.2
5	10.0	10	2	0.2
6	12.5	6	3	1.5
7	8.5	8	3	2.3
8	9.5	8	nil	0
9	12.5	9	nil	0
10	13.0	15	9	3.2

No dead standing spruce trees were recorded in this plot. Despite some root damage by H. piceus the white spruce looked healthy and vigorous.

* Warren and Nairn for #W59.

7.3.21 A Webworm, Tetralopha asperatella (Clem.).

This insect was found feeding on trembling aspen throughout the entire Hudson Bay District. The first small nests were found in the Greenbush area during the last week of July. Throughout August and September an average of three nests per tree, which contained from five to eight webworm larvae, were commonly found on trembling aspen. Although the webworm populations generally increased throughout the district this year, only very light defoliation was observed.

7.3.22 Spotless Fall Webworm, Hyphantria textor Harr.

Four scattered samples of this insect were found during the latter part of August. Two of these samples were found along the Armit Road in tp. 44, rge. 1, W-2 mer. The other collections were made in the southern portion of the Hudson Bay District at Maloneck Tower, in tp. 36, rge. 31, WP mer.,and at Madge Lake in tp. 30, rge. 30 WP mer. No defoliation was noted at these collection points.

7.3.23 Other Noteworthy Insects.

The insects listed in Table 11 were common throughout the Hudson Bay District in 1956, but caused little or no appreciable defoliation.

Table 11.

Other Noteworthy Insects which Occurred in the Hudson Bay District in 1956

Insect species	No. of Collections	Remarks
Itonida balsamicola (Lint)	4	This midge produced subglobular basal swellings at the base of balsam needles. Found on immature balsam.
Orthosia hibisci (Gm.)	6	Notable decrease in populations on t. aspen as compared to 1954-55.
Semiothisa sexmaculata (Pack)	35	Found on all tamarack. Caused no defoliation.
Nymphalis antiopa (L.).	3	Found feeding on willows and aspen. Caused no defoliation.
Sciaphila duplex	39	Leaf roller, found on t.aspen. Caused light defoliation.
Epinotia nisella criddleana	35	Leaf roller,common on most tA stands.
Epinotia solandriana	36	Leaf roller,common on most tA stands.
Zeiraphera fortunana	17	A leaf roller,found on wS,common throughout the district. Doing very little damage.

7.4 TREE DISEASE CONDITIONS

7.4.1 Canker of Trembling Aspen, Hypoxylon pruinatum.

Cankers caused by H. pruinatum were common in the aspen grove region of the Hudson Bay District (Figure 4.). A concentration of this disease was noted at Madge Lake in the Duck Mountain Provincial Forest. Several samples were also taken along the southern and western slopes of the Porcupine Provincial Forest. There seems to be a progressive tapering off of the abundance of H. pruinatum toward the northern fringes of the district. In the extreme northern sections, H. pruinatum was absent from trembling aspen stands.

7.4.2 Trunk Rot of Trembling Aspen, Radulum casearium.

Samples of this trunk rot were found in the Porcupine, Duck Mountain, and Northern Provincial Forests (Figure 5). This disease appears to be fairly widespread throughout the Hudson Bay District. R. casearium is found on the under surface of wind-blown trembling aspen trees, and is easily located in hilly country in dense stands of trembling aspen.

7.4.3 The False Tinder Fungus, Fomes igniarius.

F. igniarius commonly occurred on living and dead trembling aspen throughout the Duck Mountain, Porcupine, and Northern Provincial Forests.

7.4.4 Dwarf Mistletoe on Black Spruce, Arceuthobium pusillum.

A localized infection of dwarf mistletoe on black and white spruce was re-examined this year. It occurs in a large swamp east of Hudson Bay in tp. 44, rges. 31 and 32, WP mer. The infection appears to be confined to this area and is the only recorded dwarf mistletoe infection on spruce in Saskatchewan.

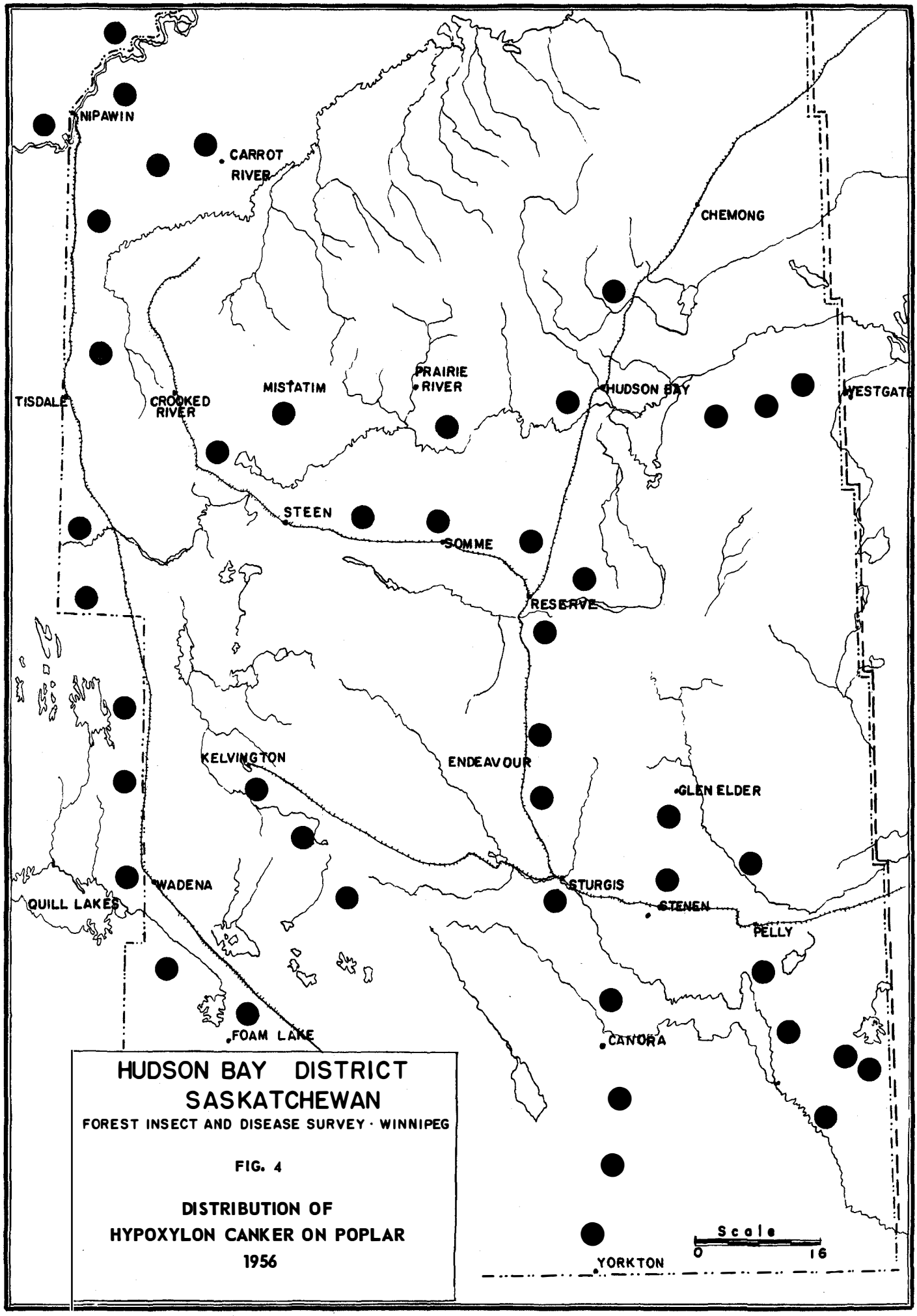
7.4.5 Mistletoe on Jack Pine, Arceuthobium americanum.

The jack-pine mistletoe infection northeast of White Fox was re-examined in 1956. For the past four years this area has been cut over and the trees infected with jack-pine mistletoe have been utilized as lumber, poles, and firewood. Because of this action the mistletoe infection has been confined to a small area and seems to be disappearing.

The parasite, Wallrothiella arceuthobii, which attacks the female flowers of the mistletoe plant was present in the White Fox area.

7.4.6 White Mottled Rot of Trembling Aspen and Birch, Fomes fomentarius.

The tinder fungus was commonly found on mature, overmature and dead white birch. It also occasionally occurred on trembling aspen. F. fomentarius was lightly distributed throughout the entire forested areas of the Hudson Bay District.

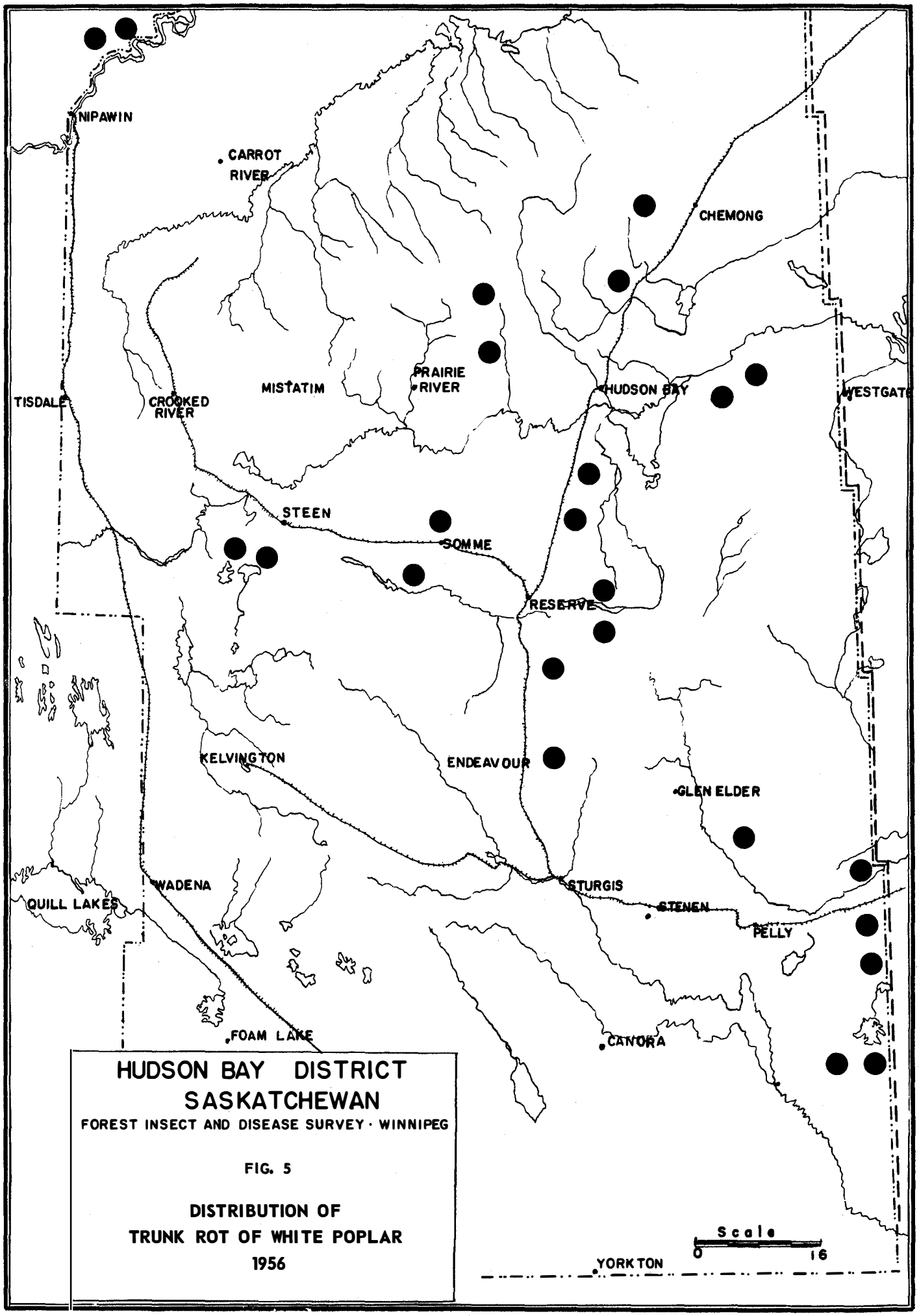


HUDSON BAY DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY · WINNIPEG

FIG. 4

DISTRIBUTION OF HYPOXYLON CANKER ON POPLAR 1956



HUDSON BAY DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY · WINNIPEG

FIG. 5

DISTRIBUTION OF TRUNK ROT OF WHITE POPLAR 1956

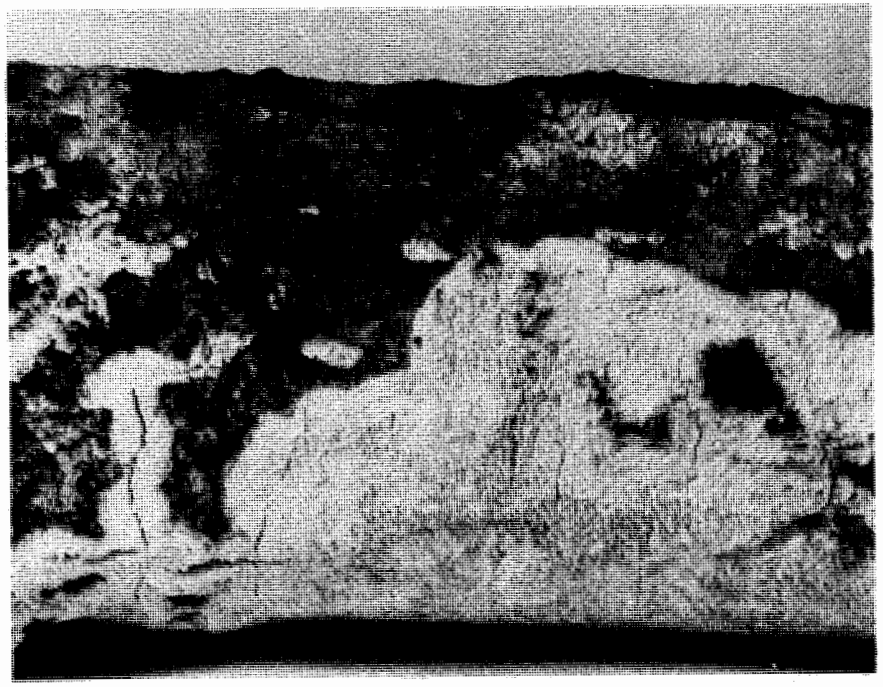


Fig.6

Radulum casearium on Underside of Wind-Thrown Trembling Aspen.
Photograph by B. McLeod.
Negative Number W-500

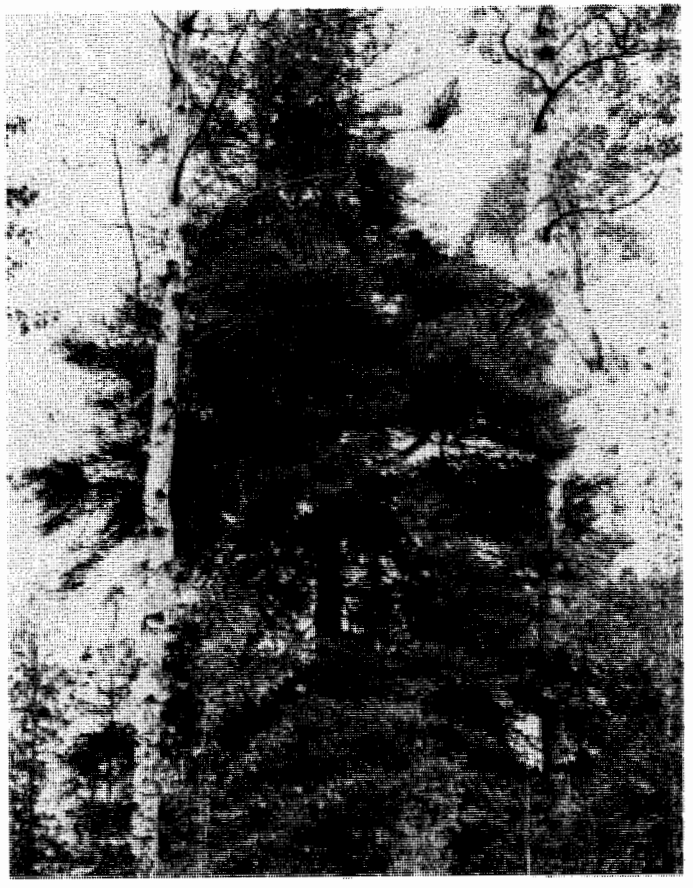


Fig.7

Dwarf Mistletoe Brooms Caused by Arceuthobium pusillum on White Spruce. Photograph by M. Pratt.
Negative Number W-501

7.4.7 Other Noteworthy Diseases.

Table 12.

Host	Locality	Causal Organism	Remarks
J. pine	Northern Provincial Forest	Armillaria root rot	found on jack pine regeneration
T. aspen	Throughout the district	Pleurotus ostreatus	slash fungus found mostly on windthrown trees
Spruce	Porcupine Provincial Forest	Chrysomyxa ledicola	much lighter than in the previous 2 years
W. spruce	Armit Road	Fomes roseus	a brown cubical rot
Aspen	Madge Lake D.M.P.F.	Sterium sp.	slash fungus
W. spruce	Armit Road	Fomes pini	a ring rot of conifers

7.5 SPECIAL PROJECTS

7.5.1 Tree Mortality Counts in Shelterbelts.

During the month of August, a survey was made of tree mortality in shelterbelts throughout the agricultural areas of the Hudson Bay District. A total of twelve shelterbelts were examined in this survey. These plantings were selected at regularly spaced intervals throughout the district in order to assess any tree mortality that might be attributed to insects or tree diseases. Table 13 summarizes the information found in each shelterbelt.

7.5.2 Phenological Studies.

Six sampling stations, well spaced throughout the Hudson Bay District, were selected within which to conduct this study. Four tree species were selected at each sample point. These were, white spruce, jack pine, trembling aspen, and tamarack. One branch from each of five tree species was tagged at eye level. The first measurement of the dominant terminal shoots was taken during the last week in June. The shoots were remeasured during the last week of August after growth was completed.

This survey was carried out to compare shoot development in plus or minus days from a common reference point such as Winnipeg or Red Rock Lake.

Table 13.
Tree Mortality Counts in Shelterbelts
Hudson Bay District of Saskatchewan

Area	Sec.	Tp.	Rge.	Mer.	T. aspen	W. spruce	M.maple	Willows	Caragana	Elm	Cottonwood	Remarks
Pelly	15	33	32	WP	nil	nil	2% had dead leaders	nil				Healthy plantation well cultivated
Chelan	5	42	10	W2	nil	nil						Healthy plantation, few insects found
Bjorkdale	21	43	12	W2	nil	nil						Healthy plantation
Etomami		43	3	W2		nil						Heavily infested with yellow-headed spruce sawfly by 1953
Armley	31	47	14	W2	nil	nil	nil					Healthy young stand
Pelly	28	33	32	WP	nil	nil	nil	nil	nil			Old plantation healthy condition
Pelly	15	33	32	WP	volunteer tA overcrowded 10	nil	nil	nil				Volunteer tA overcrowded trees dying out
Pelly	10	33	32	WP	nil	nil				nil		Healthy stand
Pelly	16	35	32	WP	2% dead from natural thinning, native stand	nil	nil		nil			

Table 13 continued

Area	Sec.	Tp.	Rge.	Mer.	T. aspen	W. spruce	M.maple	Willows	Caragana	Elm	Cottonwood	Remarks
Gorlitz	25	28	4	W2	nil		nil	nil	nil			
Sheho	7	30	9	W2	nil		nil		nil			No defoliation healthy plantation
Yorkton	5	26	4	W2			nil			nil	nil some branches broken	50 year old plantation, trees healthy

Other events, such as the first appearances of flies, flowers, etc. were also recorded. The sample stations, their locations, tree species and shoot measurements are recorded in Table 14.

Table 14.

Locations of Phenological Survey Stations
Hudson Bay District of Saskatchewan

Plot	Area	Tree species	Sec.	Tp.	Rge.	Mer.
1	White Fox	W. spruce		54	11	W-2
1	" "	T. aspen		54	11	W-2
1	" "	Tamarack		54	11	W-2
1	" "	Jack pine	23	53	12	
2	Madge Lake	T. aspen	27	30	30	W-P
2	" "	W. spruce	27	30	30	W-P
2	" "	Tamarack	27	30	30	W-P
3	Sturgis	W. spruce	28	34	5	W-2
3	"	T. aspen	28	34	5	W-2
3	Pelly	Tamarack	19	33	32	W-P
4	Chelan	W. spruce	4	42	10	W-2
4	"	T. aspen	4	42	10	W-2
4	"	Tamarack	18	42	10	W-2
5	Otosquen	W. spruce	35	46	3	W-2
5	"	J. pine	33	47	2	W-2
5	"	T. aspen	33	47	2	W-2
5	"	Tamarack	33	47	2	W-2
	Armit Road	J. pine		44	3	W-2
	" "	Tamarack		44	1	W-2
	" "	W. spruce		44	32	W-P
	" "	T. aspen		44	32	W-P

7.6 SUMMARY OF INSECT AND TREE DISEASE COLLECTIONS

Table 15 contains a summary of insect and tree disease collections taken from host trees in the Hudson Bay District in 1956.

Table 15.

Summary of Collections

Host Tree	No. of Insect Samples	No. Tree Disease Samples
Chokecherry	27	3
White spruce	87	
Alder	9	
Tamarack	54	1
Black spruce	22	3
Trembling aspen	104	13
White birch	12	
Jack pine	27	5
Willow	26	
Alder	4	
Black poplar	13	
Scots pine	1	
Balsam fir	7	
Miscellaneous	6	1
TOTALS	499	26

7.7 PERSONNEL CONTACTED

The following table lists the people contacted in the Hudson Bay District during the 1956 field season.

Table 16.

Name	Position	Address	Contacts
C. Schell	District Superintendent	Hudson Bay	many
A. Towill	Field Supervisor	Prince Albert	many
A. Stark	Field Supervisor	Hudson Bay	many
R. Whitlock	Field Supervisor	Prince Albert	many
H. Barton	Radio Operator	Hudson Bay	many
K. Smith	Forester	Carrot River	4
H. R. Peacock	Chief Forester	Hudson Bay	many
F. Priece	Construction Engineer	Hudson Bay	many
J. C. Cockwell	Field Officer	Hudson Bay	many
C. Furgusson	Field Officer	Hudson Bay	many
J. Heron	Park Superintendent	Madge Lake	many
J. M. Bacon	Field Officer	Pelly	many
A. Kirkpatrick	Field Officer	Hudson Bay	many
D. Phelan	Sask. Timber Board	Hudson Bay	many
D. Jellico	Forester	Prince Albert	4
V. P. Honig	Field Officer	Carrot River	2
D. Neely	Field Officer	Danbury	4
L. Poisson	Field Officer	Usherville	5
R. Brown	Field Officer	Hudson Bay	many
W. A. Clawson	Field Officer	Somme	7
W. Cook	Field Officer	Prairie River	4
R. Oakenfold	Field Officer	Chelan	4
H. Strom	Field Officer	Peesane	4
M. Baker	Field Officer	Madge Lake	5
E. Smith	Field Officer	Hudson Bay	many
R. Studs	Field Officer	Hudson Bay	many
F. Flavell	Forester	Hudson Bay	many
G. Forrie	Patrolman	Hudson Bay	many

8. ANNUAL REPORT OF FOREST BIOLOGY RANGER

PRINCE ALBERT DISTRICT OF SASKATCHEWAN

1956

by

J. A. Drouin

INTERIM REPORT - 1956

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

February, 1957

8.1 INTRODUCTION

Surveys of forest insects and tree diseases in the Prince Albert District were carried out from May 15 to October 15, 1956. They consisted of assessing insect populations and damage caused by major insects and tree diseases. Larch sawfly studies, including sequential sampling of egg populations, defoliation and foliage production estimates on tamarack were continued. Special collections of aphids, larch sawfly, jack-pine sawfly, scale, and jack-pine budworm were taken at intervals during the summer. A special project to determine the species complex attacking black and white spruce was carried out in two areas. Phenological stations were established at five pre-determined areas for four representative tree species. Hypomolyx study plots were established in white spruce stands. Tree disease surveys were continued with special emphasis placed on mortality of tamarack, the incidence of seedling diseases, and the occurrence of several rust fungi on conifers.

A total of 464 insect and 32 tree disease collections were made. Collections submitted by private co-operators and personnel of the Department of Natural Resources totalled 22. Approximately 10 hours flying time to cover otherwise inaccessible areas was provided by the Department of Natural Resources. The writer gratefully acknowledges the assistance given by provincial personnel and private co-operators during the 1956 season.

8.2 REVIEW OF FOREST INSECTS AND TREE DISEASES

Several noticeable changes occurred in the distribution and intensity of some of the major insects and tree diseases in the Prince Albert District in 1956. A slight decline in larch sawfly populations was recorded. The large aspen tortrix was again widely distributed but further decreases in populations were noted in all areas examined. A widespread distribution of the jack-pine budworm was noted with light increases in defoliation occurring in localized areas. A sharp decline in black-headed budworm populations, particularly in black spruce tops infested by a complex of insect species was evident throughout the district. No appreciable changes were recorded in the distribution of this species complex. Low cone production of black spruce resulted in a slight decline in the larval populations within the tree. No changes in the infestation were noticed in areas where cone production was normal. Severe skeletonization of willow foliage by the gray willow-leaf beetle was prevalent throughout the entire Prince Albert District. Wider distribution and an upward trend in populations of the sawflies on jack pine was recorded.

The yellow-headed and green-headed spruce sawflies, American poplar leaf beetle, leaf hoppers, pine scale and the ugly nest caterpillar remained at low levels of population.

Tree disease surveys indicated continued mortality of tamarack caused by a complex of factors including Cytospora canker. The spruce needle rust, Chrysomyxa sp. was widely distributed but remained light in 1956. No change was noted in the occurrence of Hypoxylon canker on trembling aspen. A leaf blight on balsam poplar, Linospora tetraspora was again light and widely scattered throughout the district.

8.3 INSECT CONDITIONS

8.3.1 Larch Sawfly, Pristiphora erichsonii (Htg.).

A further decline in the larch sawfly infestation was recorded in the Prince Albert District in 1956 (Figure 1). Ground and aerial surveys made in the latter part of the season to determine the status of the larch sawfly showed a trace to light defoliation with occasional scattered groups of trees moderately defoliated in the northwestern section of the District. The high water levels again recorded in all stands examined in the District may have had a further controlling influence on the sawfly populations and probably accounts for the extended adult emergence and egg-laying periods in 1956. High water levels in the tamarack stands persisted until the middle of July by which time foliage growth was nearly complete. Foliage production surveys conducted in the permanent sample plots generally showed a notable improvement in foliage and shoot production and the general vigor of the stand.

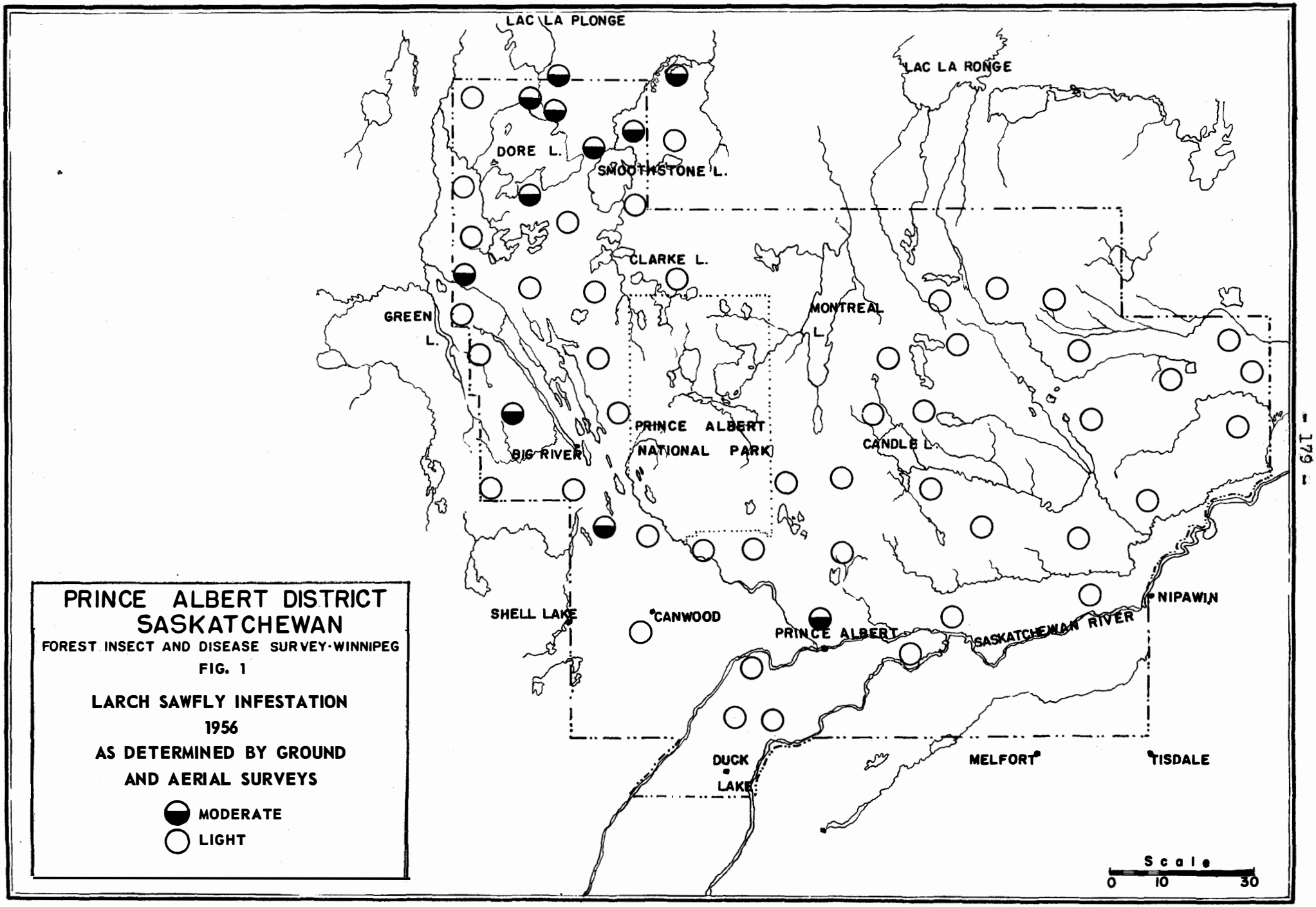
Host tree development varied in some areas. However, in general, bud scales were broken by May 17 and needles clear of the bud by May 25. First emergences of adult larch sawflies were recorded on June 25, as were oviposition scars on new shoots. By July 20, fourth and fifth instar larvae were numerous. The last larch sawfly larva was observed in the field on September 1.

Parasites and disease organisms were common in many areas. Observations and counts on larval colonies in the field indicated that seventy-five per cent of the larch sawfly larvae were parasitized by Bessa harveyi Tns., at Prince Albert with a lesser degree occurring in the Red Rock Block, Dumble, Candle Lake and Fort a la Corne areas. In numerous instances individual larch sawfly larvae had been parasitized 5 to 7 times by this species. In the disease release area near Prince Albert, disease organisms were few and scattered.

A trace to light defoliation was recorded through the entire Nisbet, Fort a la Corne, Torch River and Emma Lake Provincial forests. Northeast to Candle Lake, Whiteswan and Sandy lakes defoliation remained light. Small, scattered stands moderate defoliation occurred at Meeyomoot and Whiteswan lakes.

North of Prince Albert to the Prince Albert National Park boundaries and throughout the Big River Provincial Forest, defoliation was very light. Small, moderate infestations were observed in the Dore-Smoothstone Lake areas, along the southeast shore of Lac la Plonge, and at the south end of Emmaline Lakes. Elsewhere through the northwest portion of the District, infestations remained very light. Heavy mortality of tamarack caused by repeated flooding from high water levels was again observed along lake shores, creek beds and low lying areas.

Owing to the sharp decline in sawfly populations, mass collections of cocoons for parasite studies were obtained from only one area. A collection of 80 cocoons from north of Prince Albert showed, on dissection of the larvae, that 18.7 per cent were parasitized by Bessa harveyi and 3.7 per cent by Mesoleius tenthredinis. Disease organisms destroyed about 26 per cent of the cocooned larvae.



PRINCE ALBERT DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY-WINNIPEG

FIG. 1

LARCH SAWFLY INFESTATION

1956

AS DETERMINED BY GROUND AND AERIAL SURVEYS

MODERATE

LIGHT

Egg population sampling of the larch sawfly was carried out at eight permanent sample plots in the Prince Albert district. The infestations at the plots were rated according to the percentage utilization of current tamarack shoots for oviposition by adult sawflies. The sample counts and infestation ratings at the plots are shown in Table 1.

Table 1.
Population Estimates of the Larch Sawfly
(based on Sequential Sampling of Egg Populations)
Prince Albert District - 1956

Plot No.	Location					Infestation Rating		
	Place	Sec.	Tp.	Rge.	Mer.	No. of shoots examined	No. curled	Rating
102	Crutwell	29	49	1	W3	190	13	light
103	Ft. a la Corne	33	50	19	W2	90	4	light
104	Prince Albert	8	49	26	W2	120	6	light
107	Ft. a la Corne	4	50	20	W2	80	3	light
112	MacDowall	21	46	1	W3	50	0	light
112	Dumble	25	54	7	W3	50	0	light
113	Holbein	13	49	2	W3	80	13	medium
114	Airport Bog	19	49	25	W2	200	23	light

Since 1947, several permanent sample plots have been established in representative tamarack stands throughout the Prince Albert District for the purpose of determining mortality caused by the larch sawfly. The plots varied in size from 1/5 to 1/2 acre. All living and dead trees were tallied at the time that the plot was established. Annual defoliation records were maintained on ten sample trees in each plot during the infestation period. In 1956, the plots were retallied in order to determine the degree of tree mortality. The percentage of tree loss by basal area together with the annual defoliation records are shown in Table 2.

8.3.2 Jack-pine Budworm, Choristoneura pinus Free.

A slight decrease in jack-pine budworm populations was recorded in the Prince Albert District in 1956. However, distribution of this species remained much the same in the jack pine stands of the Home, Holbein, Red Rock, Steep Creek, Canwood and MacDowall blocks of the Nisbet Provincial Forest and throughout the areas surveyed in the Fort a la Corne Provincial Forest. Scattered, light populations were recorded at Candle Lake, Sandy Lake and in the Big River area. A small medium pocket of defoliation was recorded 4 miles west of Prince Albert.

The first 2nd instar larvae of the jack-pine budworm was observed on May 28 and by June 2 larval populations were general in the jack pine stands examined. Larval development had progressed to 4th instar by June 25 and by June 29 pupae were present. Although adult emergences commenced on June 30, larval populations were still observed in the field on July 16 in the Home Block. Numerous larval and pupal parasites were noted at mass collection points in the Home Block and Christie Lake area in the Nisbet Provincial Forest.

Table 2.

Summary of Permanent Tamarack Plots in Prince Albert District of Saskatchewan Showing Percentage Dead Trees by Basal Area and History of Larch Sawfly Defoliation during Period shown by Tally Years (Percentage of Dead Trees being the Cumulative Mortality)

Plot No.	Tally year	Tamarack only d.b.h. Living trees Range	Tamarack only d.b.h. Living trees Average	Tamarack only d.b.h. Dead trees Range	Tamarack only d.b.h. Dead trees Average	Basal area sq.ft. Living	Basal area sq.ft. Dead	Basal area sq.ft. % loss	Total all species Basal area Living	Total all species Basal area Dead	Total all species Basal area % loss	Defoliation history of tamarack Year	Defoliation history of tamarack %	Remarks
102	1947	1-5	2.3	1-2	1.1	11.790	.119	.999	12.061	.119	.977	1947	0	Wet site-growth very good-very light defoliation.Pure stand with few scattered wS.Condition to tL causing some mortality
												1948	0	
												1949	0	
												1950	0	
	1956	1-8	3.7	1-7	2.3	23.151	.980	4.06	24.410	.980	4.06	1951	74	
												1952	10	
												1953	54	
												1954	23	
												1955	5	
												1956	10	
103	1949	1-10	4.3	-	-	53.578	-	-	53.578	-	-	1949	62	Wet site-surface water. Scattered mortality caused by condition of tL. D. simplex found on dying trees
												1950	89	
												1951	97	
												1952	34	
	1956	1-9	5.1	1-6	2.6	39.557	7.634	16.18	39.704	7.634	16.12	1953	38	
												1954	2	
												1955	0	
												1956	0	
104	1949	1-6	2.1	1"	1.0	9.239	.025	.27	12.555	.025	.020	1949	30	Dry site-mixed bS with scattered bPo. Heavy defoliation in previous years.Growth good.
												1950	58	
												1951	32	
												1952	36	
	1956	1-8	3.4	1-3	1.5	9.590	.064	.662	15.203	.069	.451	1953	41	
												1954	9	
												1955	1	
												1956	11	

Table 2 continued

Plot No.	Tally year	Tamarack only d.b.h. Living trees Range	Tamarack only d.b.h. Living trees Average	Tamarack only d.b.h. Dead trees Range	Tamarack only d.b.h. Dead trees Average	Basal area sq.ft. Living	Basal area sq.ft. Dead	Basal area sq.ft. % loss	Total all species Basal area Living	Total all species Basal area Dead	Total all species Basal area % loss	Defoliation history of tamarack Year	Defoliation history of tamarack %	Remarks
107	1949	1-7	2.9	1-3	2.0	15.237	.282	1.82	15.362	.282	1.79	1949	0.5	Wet site-surface water. Growth conditions fair.
												1950	83	
												1951	93	
												1952	13	
	1956	1-7	3.0	1-6	2.7	5.202	.799	13.31	5.479	.799	14.58	1953	34	Mixed bS. Defoliation history light.
												1954	1	
												1955	2	
												1956	0	
112 A*	1950	1-7	2.7	1-5	1.1	24.579	.941	3.68	24.579	.941	3.68	1950	89	Wet site-mixed bS. Heavy mortality from condition to tL. D. simplex bark beetles present on all dying trees.
												1951	73	
												1952	16	
												1953	7	
	1956	1-8	3.3	1-7	2.0	24.450	3.879	13.69	24.450	3.879	13.69	1954	1	
												1955	0	
												1956	0	
112 B*	1955	1-5	2.6	1-5	3.0	4.982	.141	.275	8.644	.141	1.60	1955	1	Wet site, mixed bS, tL. Poor growth. Surface water year round
	1956	1-6	2.9	-	-	6.006	-	-	9.446	-	-	1956	2	
113	1950	1-9	4.2	1-3	1.2	27.691	.195	.695	29.524	.195	.656	1950	90	Dry site-mixed bS, wS. Heavy defol. in past years. Condition of larch observed in 1953
												1951	83	
												1952	13	
												1953	32	
	1956	1-9	4.7	1-2	1.4	33.932	.059	.173	38.857	.059	.151	1954	18	
												1955	8	
												1956	13	
114	1950	1-10	2.3	1-3	1.0	39.272	1.502	3.68	39.489	1.502	3.66	1950	78	Wet site, surface water present. Medium mortality caused by condition of tL. D. simplex found on all dying tL
												1951	80	
												1952	56	
												1953	70	
	1956	1-9	2.9	1-6	1.9	40.924	3.447	7.76	41.713	3.447	7.63	1954	24	
												1955	2	
												1956	0	

* McDowall Block 112 B - Dumble

8.3.3 Black-headed Budworm, Acleris variana Fern.

No appreciable changes in populations of this species were noted in the Prince Albert District in 1956. Light defoliation was observed on white and black spruce in the open growing stands and shelterbelts throughout the agricultural areas in the Sturgeon Lake, Home Block and Duck Lake areas. In general, medium populations were confined to pockets of open growing white or black spruce and were closely associated with a complex of species attacking black spruce.

Black-headed budworm feeding in the upper crown of "club-topped" black spruce caused no noticeable"browning" of the foliage indicating a decrease in populations from 1955. Light to medium defoliation was recorded on aerial surveys at Dore and Smoothstone lakes, Lac la Plonge, Meeyomoot, Sandy and Little Bear lakes.

Black-headed budworm larvae were first collected on June 3 following closely the opening of the bud sheaths on the host which occurred June 2 in the Prince Albert area. In August, black spruce tops were examined for a complex of insect species and it was noted that black-headed budworm pupae were common in the frass and webbing within the crown.

8.3.4 A Complex of Insect Species Attacking Black Spruce.

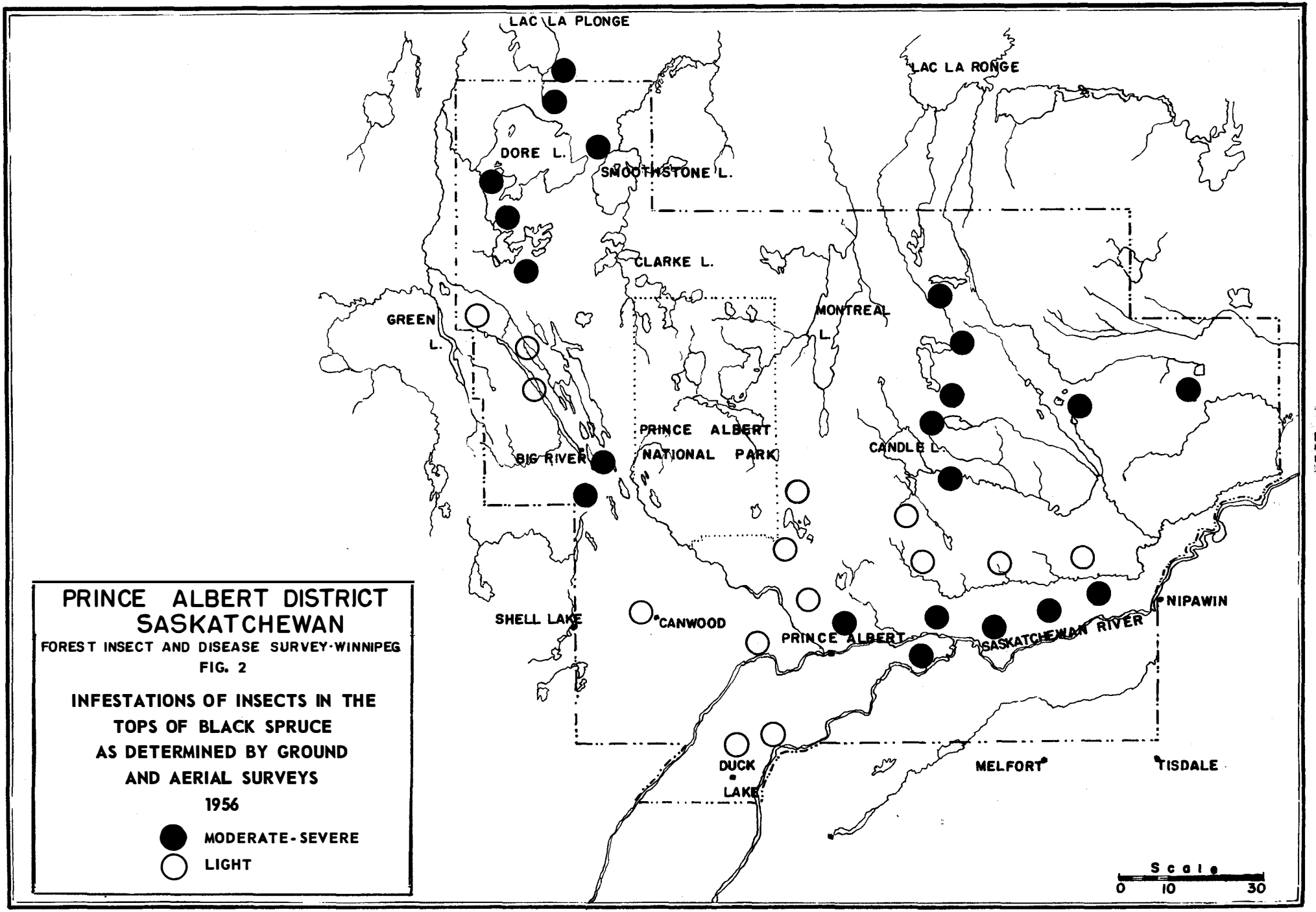
The severe infestation of a complex of species on heavily coned black spruce continued in the Prince Albert District in 1956.

Additional ground and aerial surveys showed that damage and defoliation to the current cone and needle growth varied from light to heavy (Figure 2). A decline in the coneworm and leaf roller populations was recorded in all areas, probably due to the decrease in cone production. This factor together with the decline in black-headed budworm populations resulted in no outside browning of the black spruce tops as occurred in 1955. It also caused a slight change in larval populations inside the tops. In areas where cone production was nearly normal such as at Whiteswan and Leonard lakes, no changes in the intensity of the attack other than by black-headed budworm was observed.

The following larvae were first observed feeding on May 23: a leaf roller, Archips alberta; the spruce needle miner, Herculia thymetusalis; and the coneworm, Dioryctria abietella. By June 3 the owlet moth, Epizeuxis aemula, numerous needle miners and hymenopterous parasites were recorded in the black spruce tops examined. This date coincided with the beginning of staminate flower production and opening of black spruce buds.

In early July, larval populations were moving into the new growth causing considerable webbing and light defoliation. By the latter part of July larval populations were especially high which coincided with the advanced development of cones.

Pupae were abundant on August 10, and egg masses on cones were first seen on September 6 at Candle Lake.


LAC LA PLONGE
LAC LA RONGE
DORE L.
SMOOTHSTONE L.
CLARKE L.
GREEN L.
MONTREAL L.
PRINCE ALBERT NATIONAL PARK
BIG RIVER
CANDLE L.
SHELL LAKE
CANWOOD
PRINCE ALBERT
SASKATCHEWAN RIVER
NIPAWIN
DUCK LAKE
MELFORT
TISDALE
PRINCE ALBERT DISTRICT
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY-WINNIPEG
FIG. 2
INFESTATIONS OF INSECTS IN THE TOPS OF BLACK SPRUCE AS DETERMINED BY GROUND AND AERIAL SURVEYS
1956
MODERATE-SEVERE
LIGHT
Scale
0 10 30

After two years of observation it is fairly certain that the black-headed budworm when at epidemic levels is the primary cause of the outside visible defoliation on black spruce tops. H. thymetusalis, A. alberta and E. aemula were the chief components of the defoliating species but the needle miners, Gelechiid spp. were also involved. The principal cone feeders were D. abietella and H. thymetusalis (Table 3).

Surveys consisted of defoliation appraisal in white spruce and mixed stands, but a special branch-sampling technique was required in certain black spruce stands when it was apparent that several species were causing defoliation or damage to cones.

Moderate to severe defoliation of current growth was recorded throughout the Nisbet Provincial Forest, Fort a la Corne Provincial Forest and the Big River area. High populations also caused moderate to severe cone damage at Lac la Plonge, Dore and Smoothstone lakes and in the eastern section of the district at Candle, Leonard, Whiteswan, Sandy, Little Bear, and Cub lakes. The degree of damage in the above areas area 0 to 20 per cent on current growth and from 10 to 75 per cent on old foliage and cones. Additional information was also gathered by ground and aerial surveys on infestation ratings at approximate 20 mile intervals.

The locations of the collections and intensity of defoliation are shown in Table 3.

Table 3.
Infestation Recordings on Black Spruce
Prince Albert District - 1956

Location	Grid	Degree of Infestation
Holbein	8-073-311	severe
Red Rock Block	8-078-311	moderate
Dumble	8-064-319	severe
Steep Creek	8-081-311	moderate
Fort a la Corne	8-083-312	severe
Candle Lake	8-081-318	moderate
Whiteswan Lake	8-084-328	severe
Whitegull Lake	8-083-322	moderate
Meeyomoot Lake	8-082-332	moderate
Little Bear Lake	8-088-330	light
Sandy Lake	8-093-333	light
Sled Lake	8-062-331	severe
Beaupre Lake	8-061-334	moderate
Angling Lake	8-075-319	light
Smoothstone Lake	8-062-342	moderate
Lac la Plonge	8-064-336	moderate
Torch River	8-083-320	severe
MacDowall	8-074-307	light
Crutwell	8-074-311	moderate
Canwood	8-068-313	moderate

The insect species found in the tops of black spruce listed in order of abundance are shown in Table 4. Seasonal occurrence and feeding habits are also included.

Table 4.
Insect Species Infesting the Tops of Black Spruce
Prince Albert District - 1956

Insect Species	Feeding Habits	Seasonal Occurrence	Abundance*	Remarks
Herculia thymetusalis	Feeds on old & new foliage	May to September	170 larvae and pupae	Most abundant species found on club-topped bS
Dioryctria abietella	Bores into cones	May to September	67 larvae and pupae	Feeds mainly on current cones - very active larvae
Archips alberta	Old & current foliage depending on availability	May to September	44 larvae and pupae	Larvae sluggish-very susceptible to heat and direct sunlight
Epizeuxis aemula	Old and current foliage	June to August	33 larvae and pupae	Generally found feeding on outside of crown. Frequently pupates in frass and webbing of inner crown
Gelechiid sp.	Needle miners	June to Sept.	36 larvae	Species very abundant in July to Sept. Larvae minute and quite active
Cinara mariana	Plant louse	July to Sept.	30 collections	Abundant at all check points
Formicid spp.		July to Sept.	30 collections	Tending plant louse
Glypta sp.	parasite	May to Sept.	5	Pupae found in frass & webbing
Apanteles sp.	parasite	"	1	"
Diptera sp.	parasite	"	2	"
Chalcid sp.	parasite	"	1	"
Syrphid sp.	predator	June to August	2	Low populations
Chlorochia uhleri	predator	July to August	1	Stink bug - occasional only

*Abundance based on examination of 39 black spruce tops.

A special method of sampling black spruce was applied in an effort to determine the distribution, population levels, defoliation, damage and food preference of a complex of species. One branch was selected from each of the lower and mid-crown and 3 branches from the upper crown. Insects were collected from each of the four classified feeding areas; old foliage, new foliage, cones and miscellaneous. Defoliation and cone damage by crown levels is listed in Table 5.

8.3.5 Large Aspen Tortrix, Choristoneura conflictana Wlk.

This species was still prevalent in all areas examined but a decrease in populations and defoliation occurred. In the areas heavily defoliated in 1955, namely Duck Lake, MacDowall Block, west of Prince Albert, Sturgeon Lake and Steep Creek areas, only scattered populations remained and caused only very light defoliation. The first larvae of the large aspen tortrix were recorded May 22 in the Home Block at which time they were found boring into the buds and webbing around the bud scales. By June 2, second and third instar larvae were common on trembling aspen and balsam poplar. By June 11 pupation was general with the first adult emergences observed on June 25. Severe frost damage was observed in many trembling aspen stands south of Prince Albert in the MacDowall Block and Duck Lake areas. Host development showed bud sheaths breaking on May 17 with the leaflets free by May 22.

Light larval and pupal parasitism and some predation by robins and warblers of the large aspen tortrix was observed through the district.

8.3.6 American Poplar Leaf Beetle, Gonioctena americana (Schaeff.).

This leaf beetle caused light to severe defoliation at scattered points in the District. Severe defoliation was confined to reproduction and open growing stands of trembling aspen. Medium to severe defoliation of scattered open growing trees was recorded west of Duck Lake, in the Smeaton area and in the MacDowall Block. The same condition prevailed at scattered points in the Home, Holbein, Red Rock and Steep Creek Blocks of the Nisbet Provincial Forest. Occasional pockets of defoliation were also noted at Spruce Home, Sturgeon Lake and in the Emma Lake Provincial Forest south of Angling Lake.

8.3.7 Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.).

Populations of this species were very low in the Prince Albert District in 1956. A few larvae, causing only very light defoliation, were recorded on white spruce and black spruce regeneration in the Home Block.

8.3.8 Green-headed Spruce Sawfly, Pikonema dimmockii (Cress.).

Larval populations of this insect were very low and they caused no defoliation.

8.3.9 Red Pine Sawfly, Neodiprion nanulus nanulus.

Surveys of jack pine stands in the Nisbet and Fort a la Corne Provincial forests produced scattered colonies of this sawfly. They caused light defoliation in the Home, Steep Creek blocks at a plantation 9 miles

Table 5.
Defoliation and Cone Damage Caused by Species Complex of Insects Attacking
Black and White Spruce
Prince Albert District - 1956

Tree species	Location	Time examined	Lower Crown Branch		Mid Crown Branch		Upper Crown Branch		Ave.No. of cones per branch	% cones damaged
			Area sq.in.	% Defoliation	Area sq.in.	% Defoliation	Area sq.in.	% Defoliation		
Black spruce	Candle Lake	spring	1480	0	720	0	93	5	17	58
	Candle Lake	fall	1400	0	725	0	72	5	15	72
Black spruce	Beaupre Lake	spring	561	0	520	0	226	10	20	58
	Beaupre Lake	fall	1176	0	720	0	248	5	26	75
White spruce	Candle Lake	spring	2160	0	768	0	384	0	22	96
	Candle Lake	fall	1305	0	2030	0	974	0	11	100
White spruce	Sled Lake	spring	3456	0	1440	0	1305	0	0	0
	Sled Lake	fall	744	0	840	0	88	0	0	0

west of Prince Albert and 4 miles north of English Cabin (Figures 3,4). Defoliation was confined to occasional branches in the lower third of mature trees and to jack pine regeneration.

8.3.10 Red-headed Jack Pine Sawfly, Neodiprion virginiana.

Light populations of this species were found in August in scattered sections of the Prince Albert District. A small pocket of medium defoliation of immature jack pine was located 4 miles west of Prince Albert. Additional samples of this species were found in the Home, MacDowall and Red Rock blocks and at Meeyomoot Lake.

8.3.11 The Poplar Borer, Saperda calcarata Say.

This poplar borer continued to cause light to severe damage in stagnated, open-growing trembling aspen stands (Figure 5). Medium to heavy damage was recorded in the MacDowall and Steep Creek blocks and in the agricultural areas west of Prince Albert.

Damaged trees, identified by the large quantities of fibrous frass exuding from the larval galleries were observed at numerous other scattered points in the District (Figures 6, 7, 8). Also causing serious injury was a species of Cossidae found in the MacDowall Block and 4 miles west of Prince Albert (Figures 9, 10). The larvae were boring, more or less vertically, in the heartwood of the trees in large burrows up to 1/2 inch in diameter. Many trees weakened by the tunnelling of the poplar borer and the Cossid sp. were dying. At all check points, trembling aspen in the 4" and 5" d.b.h. class showed the heaviest poplar borer damage.

8.3.12 Pitch Nodule Maker, Petrova albicapitana (Busck.).

This insect species was still prevalent in the Prince Albert District in 1956 with no appreciable change in the intensity and distribution of the infestation. An old infestation of the pitch nodule maker was still active in a 40-acre plantation west of Prince Albert. Light pitch nodule maker damage was also recorded in heavy stands of jack pine regeneration south of Angling Lake in the Emma Lake Provincial Forest.

8.3.13 A Pine Scale, Toumeyella sp.

A further decrease in scale populations was recorded in 1956. Light scale damage, previously reported in the Holbein and Steep Creek blocks, had decreased to nil. Small stands of lightly infested jack pine regeneration were observed 4 miles west of Prince Albert and at the east boundary of the Red Rock Block.

8.3.14 A Sawfly, Xyelid sp.

This sawfly on jack pine bores into the current terminal shoot near the base, forming a gall (Figure 11). The swellings, varying in size from 1/4" thick to approximately 1/2" long, were recorded at Sandy Lake 14 miles north of Candle Lake, in jack pine regeneration south of Candle Lake and in the Whitegull-Whiteswan lakes area. Occasional terminal damage was also observed throughout the Home Block, Nisbet Provincial Forest. No mortality of the terminal damage was also observed throughout the Home Block, Nisbet Provincial Forest.

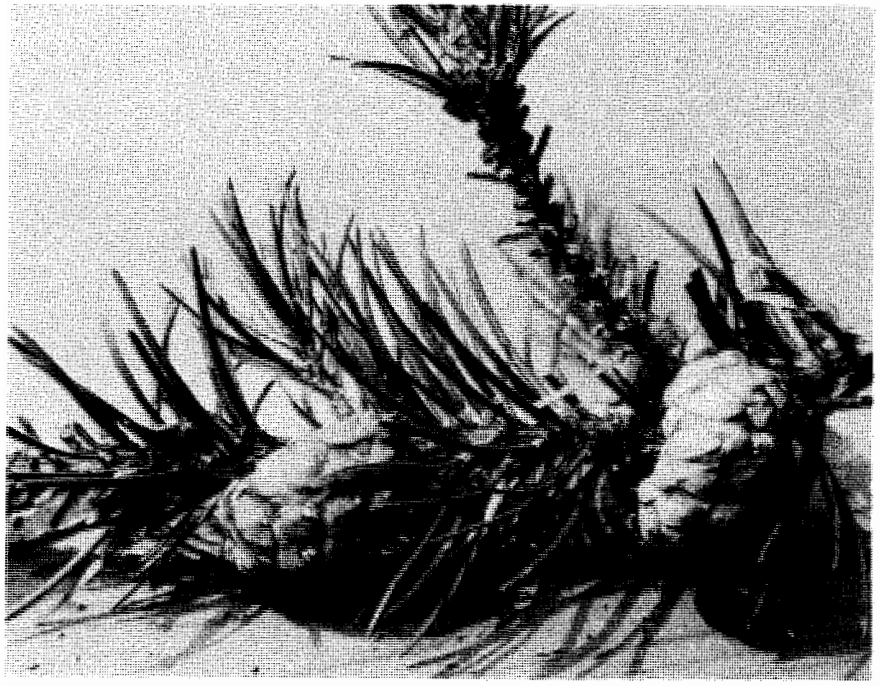


Fig.3

Fig.4

Figs.3 and 4. Colonies of Neodiprion virginiana on Jack Pine. Note Stripping of Old Foliage.
Photographs by J.A. Drouin.
Negative Numbers W-489
W-490

Fig.5

Tunneling in Trembling Aspen
by Saperda calcarata.
Photograph by J.A. Drouin
Negative Number W-462

Fig.6

Exterior Symptoms of Tunneling
by Saperda calcarata.
Photograph by J.A. Drouin
Negative Number W-463

Fig.7

Pupa of Saperda calcarata in Pupal Chamber in Trembling Aspen.
Photograph by J.A. Drouin.
Negative Number W-459

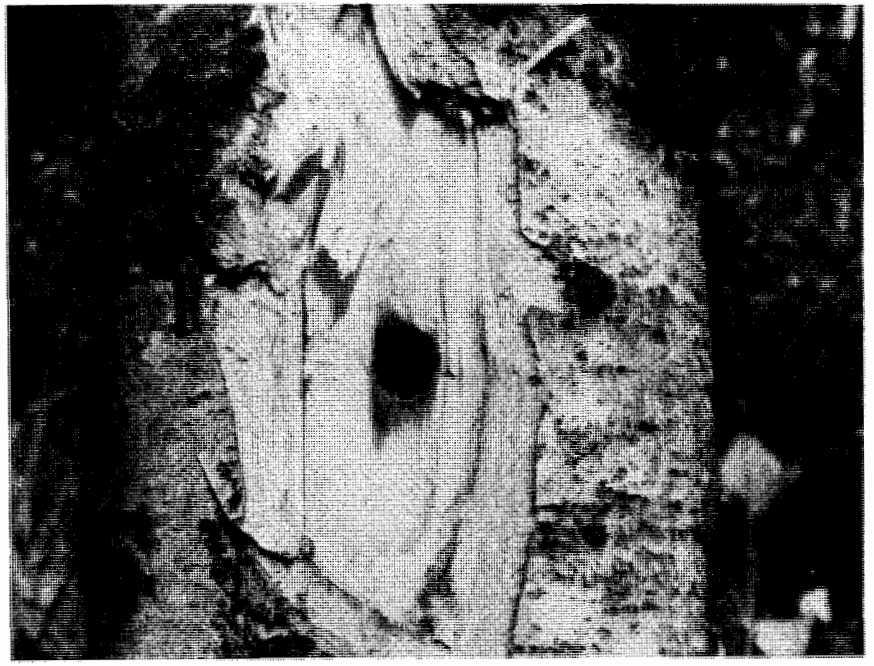


Fig.8

Emergence Hole of Saperda calcarata in Trembling Aspen.
Photograph by J.A. Drouin.
Negative Number W-461

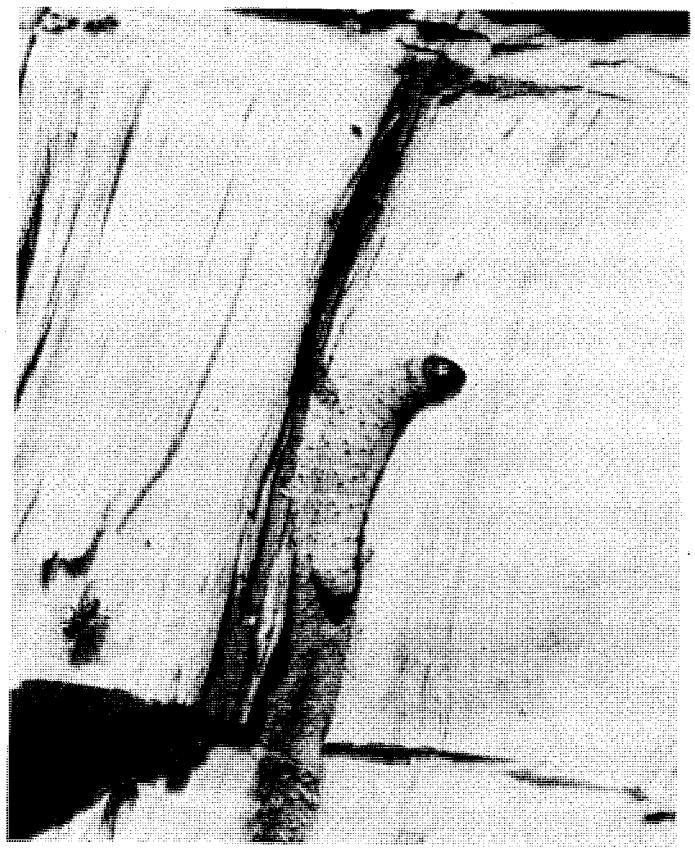


Fig.9

Fig.10

Figs.9 and 10. Larvae of a Species of COSSIDAE Tunneling in Trembling Aspen.
Photographs by J.A. Drouin.
Negative Numbers W-487
W-488

No mortality of the terminals was noted in the areas examined. However, infested terminals appear to be weakened.

8.3.15 White Pine Weevil, Pissodes strobi (Peck.).

Light damage to leaders of black and white spruce and jack pine by this species occurred in the Prince Albert District. The first damaged leader on white spruce was noted on July 4 in the Crutwell area and one jack pine on July 12 at Candle Lake (Figure 12). Numerous curled leaders on black and white spruce occurred in the Fort a la Corne Provincial Forest, the MacDowall Block, and at Crutwell. Scattered leader damage was observed in the Dore Lake, Big River areas and in the Emma Lake Provincial Forest.

8.3.16 Eastern Larch Beetle, Dendroctonus simplex Lec.

No appreciable change in populations of this species was noted in the infected areas reported in 1955. Additional samples of this species were found on dying tamarack trees in the Fort a la Corne area north of English Cabin, and in a large tamarack swamp in the MacDowall Block. Numerous infected trees were also observed in the Red Rock Block.

8.3.17 Gray Willow-leaf Beetle, Galerucella decora Say.

Severe skeletonizing of willow foliage by the willow-leaf beetle was prevalent throughout the whole of the Prince Albert District in 1956 (Figure 13). Medium to severe skeletonizing was general in the southern portion of Prince Albert, east to the Fort a la Corne Provincial Forest, through the Steep Creek Block and west to Shell Lake.

In the northwest portion of the District, medium to severe skeletonizing was general along the west boundary of the Prince Albert National Park, in the Big River Provincial Forest, and north in the Dore, Smoothstone, Emmaline lakes areas.

Willow foliage exhibiting a burnt over appearance indicating heavy populations extended through the Candle, Fishing and Cub lakes areas to the eastern boundaries of the Prince Albert District at Sandy Lake.

8.3.18 Ugly Nest Tortrix, Archips cerasivorana (Fitch).

No appreciable change was observed in the occurrence of this species in 1956. Concentrations of nests were recorded east of Whitestar to Strong Pine on the west boundary of the Fort a la Corne Provincial Forest. In all cases occurrence was confined to agricultural and marginal lands.

8.3.19 A Leaf Hopper, Idiocerus sp.

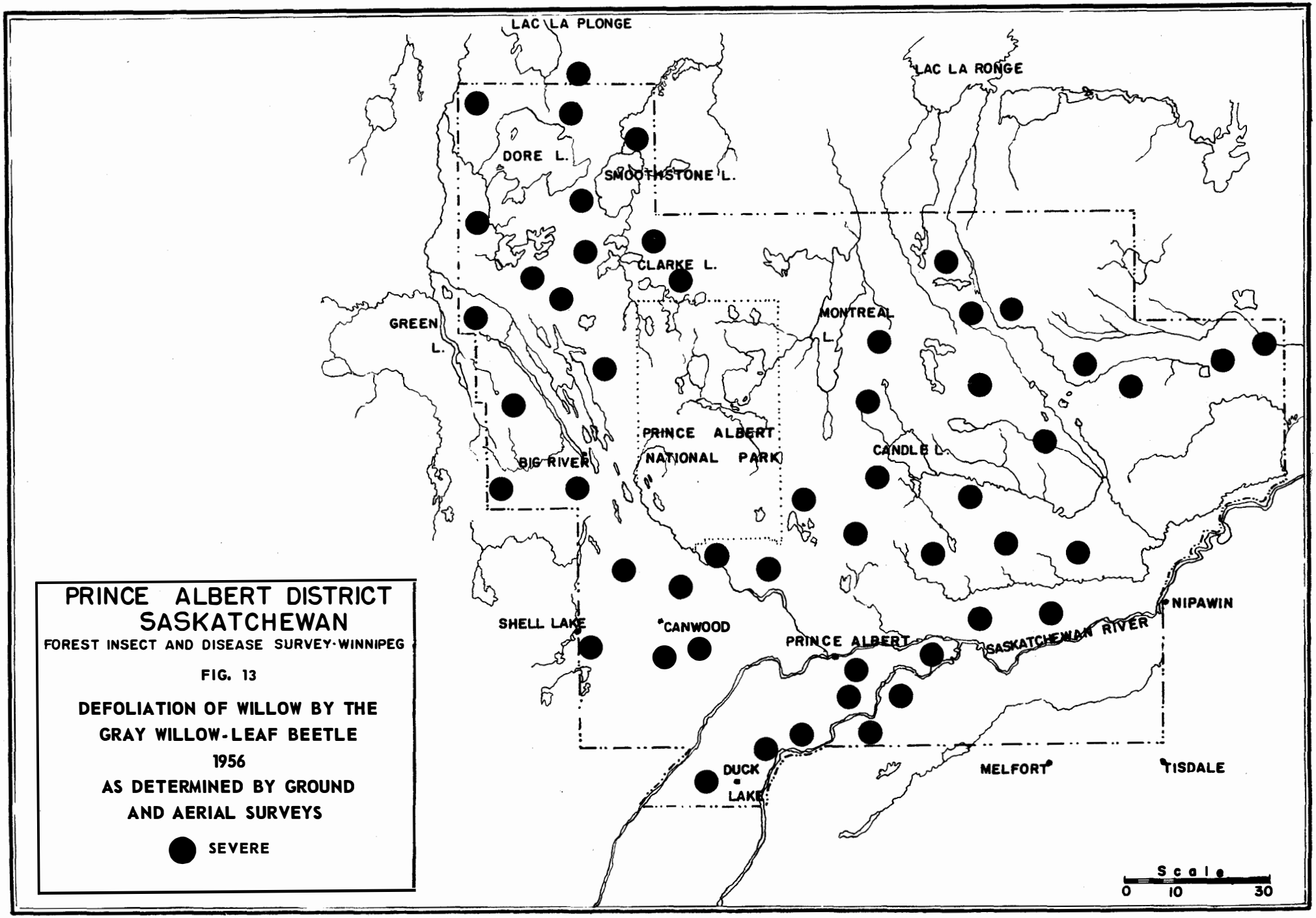
Light to moderate populations of leaf hoppers were recorded on all trembling aspen, balsam poplar, willow and alder stands. The first adult leaf hopper emergence occurred on May 22 on trembling aspen.

Fig.11

Typical Swelling of a Current Shoot of Jack Pine Caused by a Sawfly (XYELIDAE).
Photograph by J.A. Drouin
Negative Number W-491

Fig.12

Pupal Cells of Pissodes strobi in Jack Pine Leader. Photograph by B. McLeod.
Negative Number W-151



PRINCE ALBERT DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY-WINNIPEG

FIG. 13

DEFOLIATION OF WILLOW BY THE GRAY WILLOW-LEAF BEETLE 1956 AS DETERMINED BY GROUND AND AERIAL SURVEYS

● SEVERE

8.3.20 The Cone Borer, Laspeyresia youngana (Kearf.).

This insect was widely distributed throughout the white spruce stands in the Prince Albert District. The larvae, which bore into cones of spruce and feed on the seeds were prevalent in the Candle Lake and MacDowall areas. Scattered samples were also obtained at Shell Lake, Christopher Lake, Spruce Home and the Dore-Sled lakes area.

Special sampling techniques, similar to those used on black spruce, showed heavy cone damage varying from 45 per cent to 100 per cent at Candle Lake. At all points examined, the larvae showed no feeding preference in the different tree age classes or site conditions. Further outline will be found in "Special Reports".

8.3.21 A Root Weevil, Hylobius sp.

A survey of white spruce stands was conducted at Candle and Green lakes to determine root damage and tree mortality caused by this weevil. Stand composition and mortality of trees was determined by random pairs cruises. Weevil damage to the roots of white spruce was appraised by critical examination of the root systems of 10 sample trees. A damage index was applied to each infected root system.

The stand composition and tree mortality in the Candle Lake plot is shown in Table 6. The damage index for infested white spruce is shown in Table 6a. Similar data for the plot at Green Lake are shown in Tables 7 and 7a.

Table 6.
Summary of Mortality Cruise by Random Pair Method
Candle Lake, Saskatchewan - 1956
Prince Albert District Plot No. 1 Sec. 16, tp. 55, rge. 22, W2

Tree species	Distribution of Random Pairs by Diameter Class (expressed as No. of trees)								Percentage distribution by tree species	
	3" - 6.5"		6.6" - 9.5"		9.6" - 12.5"		12.6" +			
	L	D	L	D	L	D	L	D	L	D
wS	28	0	31	2	21	0	4	0	60.0	1.5
bF	20	0	6	1	3	0	0	0	20.7	0.7
tA	7	0	5	1	6	2	2	0	14.3	2.1
wB	0	0	1	0	0	0	0	0	0.7	0.0

No. of Pairs Tallied..... 70
Average distance between pairs..... 11.8
Estimated stems per acre.....362

Table 6a.
Hypomolyx spp. Damage Index and Percentage
Diseased Roots in a Ten Tree Sample in above Plot
Prince Albert District Plot No. 1 Sec. 16, tp. 55, rge. 22, W2

Tree No.	d.b.h. in.	Tree height ft.	*Hypomolyx* damage index	Total Percentage of roots diseased	Percentage of the diseased roots with insect damage
1	14.5	65	1.0	0	0
2	8.8	57	0.0	0	0
3	4.8	34	1.0	0	0
4	6.1	57	0.0	0	0
5	9.0	61	1.0	0	0
6	8.5	57	2.3	33	75
7	4.5	37	0.0	0	0
8	6.5	43	4.35	59	90
9	7.0	46	1.1	7	100
10	5.0	50	1.1	0	0

Table 7.
Summary of Mortality Cruise by Random Pair Method
Green Lake, Saskatchewan - 1956
Meadow Lake District Plot No. 2 Sec. 3, tp. 61, rge. 11, W3

Tree species	Distribution of Random Pairs by Diameter Class (expressed as No. of trees)								Percentage distribution by tree species	
	3" - 6.5"		6.6" - 9.5"		9.6" - 12.5"		12.6" +			
	L	D	L	D	L	D	L	D	L	D
wS	24	7	25	1	6	0	1	0	40.0	5.7
bS	21	0	9	0	0	0	0	0	21.4	0.0
tA	2	1	13	2	9	0	7	0	22.2	2.1
bPo	3	1	5	1	2	0	0	0	7.1	1.5

No. of pairs tallied..... 70
Average distance between pairs..... 9.45 feet
Estimated stems per acre.....564

Table 7a.
Hypomolyx spp. Damage Index and Percentage
Diseased Roots in a Ten Tree Sample in above Plot
Meadow Lake District Plot No. 2 Sec. 3, tp. 61, rge. 11, W3

Tree No.	d.b.h. in.	Tree height ft.	Hypomolyx damage index	Total Percentage of roots diseased	Percentage of the diseased roots with insect damage
1	8.0	60	2.7	13	100
2	9.1	68	3.5	11	25
3	9.25	68	1.0	0	0
4	6.9	53	4.8	26	57
5	6.8	55	1.1	0	0
6	5.8	48	3.5	9	33
7	6.8	58	0.0	0	0
8	10.25	63	1.2	13	0
9	5.25	45	1.1	5	0
10	14.9	75	3.5	43	50

8.3.22 Other Noteworthy Insects.

The following insect species were generally distributed throughout the Prince Albert District but caused no noticeable defoliation.

Table 8.

Insect Species	No. of Collections	Remarks
Taniva albolinea	2	Prevalent on white and black spruce sheltervelts
Acrobasis betulella	1	Feeds on birch. Populations low in '56.
Dioryctria reniculella	3	Low populations, caused very light defoliation
Cinara sp.	36	Aphids general on all tree types examined
Malacosoma lutescens	3	"Tents" found on ecCh in Home Blk.
Tetralopha asperatella	4	General on tA stands. Caused very little defoliation
Lithocolletis salicifoliella	2	Very light damage in all tA stands

Table 8 continued

Insect Species	No. of Collections	Remarks
Halisidota maculata	11	Light to medium defoliation on willow and alder
Gracillaria negundella	2	Found causing light damage to Manitoba maple shelterbelts

8.4 TREE DISEASE CONDITIONS

8.4.1 Condition of Tamarack.

Tree mortality caused by a complex of site, insect, canker, dieback and water level factors continued in some tamarack stands of the Prince Albert District. Mortality was most severe in the tamarack stands in the MacDowall Block, Red Rock Block and 5 miles north of English Cabin in the Fort a la Corne Provincial Forest. Light tree mortality was also recorded in the Crutwell area.

Re-tallies of all permanent sample plots in the district were made in 1956 to determine the mortality in tamarack stands caused by insect, disease or site factors. The results of the mortality tallies are shown in Table 2.

8.4.2 Armillaria Root Rot of Jack Pine, Armillaria mellea.

No change in distribution of this root rot on jack pine was recorded in 1956. A small pocket of infection, 8 miles west of headquarters in the MacDowall Block was causing light to medium mortality of jack pine regeneration. Trees infected range from 2 to 10 feet high. General vigor of the host was poor, due apparently to soil conditions. Additional records of occurrence of this root rot were obtained at scattered points in the Candle Lake area.

8.4.3 Spruce Needle Rust, Chrysomyxa ledicola.

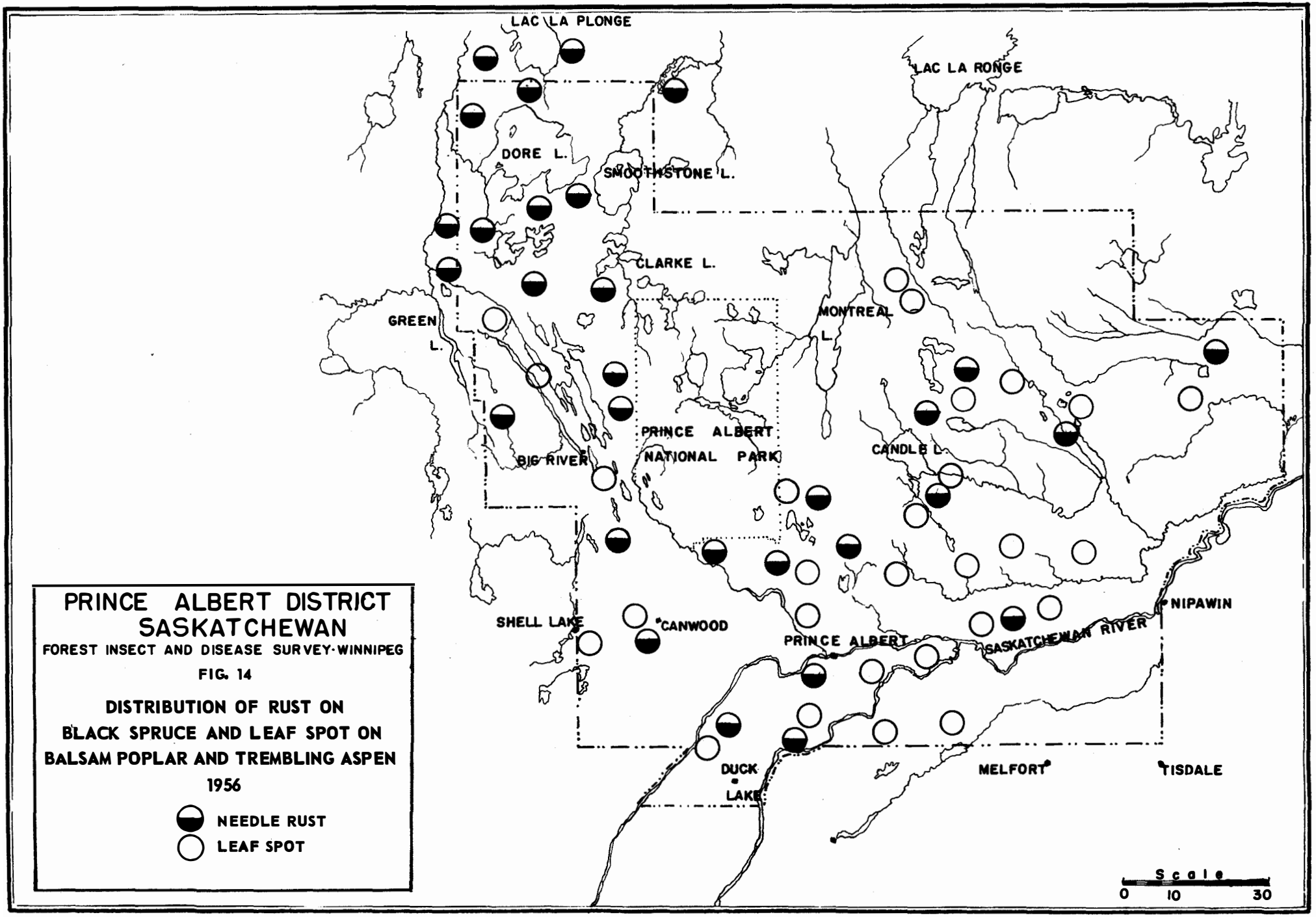
A slight increase in spruce needle rust on black and white spruce was recorded in 1956 (Figure 14).

Light rust infections were noted in the Candle - Whiteswan lakes area and in the Emma Lake and Fort a la Corne Provincial forests.

During aerial surveys light rust infections in the Big River Provincial Forest and in Dore-Smoothstone lakes area. In the southern sections of the district, only very light rust damage was observed.

8.4.4 Mistletoe on Jack Pine, Arceuthobium americanum.

Mortality of jack pine caused by mistletoe continued to increase in the heavily infected stands in the Nisbet and Fort a la Corne Provincial forests. Cutting operations were still underway in an effort to reduce damage and salvage some of the timber. Aerial surveys in the Emmaline Lakes area showed severe mortality occurring in the extensive jack pine stands on the sandy ridges.



PRINCE ALBERT DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY · WINNIPEG

FIG. 14

DISTRIBUTION OF RUST ON BLACK SPRUCE AND LEAF SPOT ON BALSAM POPLAR AND TREMBLING ASPEN

1956

● NEEDLE RUST

○ LEAF SPOT

8.4.5 Yellow Witches'-Broom, Peridermium coloradense.

Additional samples of this rust fungus were obtained in the Whitegull and Whiteswan lakes area and at Leonard Lake.

8.4.6 Canker of Poplar, Hypoxylon pruinatum.

No change in the occurrence of H. pruinatum was noted in 1956. Canker damage and tree mortality occurred in varying degrees of intensity in most of the trembling aspen stands examined.

8.4.7 A Leaf Blight, Linospora tetraspora.

This leaf blight was prevalent in varying degrees of severity on the foliage of regeneration balsam poplar throughout the Prince Albert District (Figure 14).

Moderate discoloration of foliage occurred in most balsam poplar regeneration in the Nisbet Provincial Forest, Fort a la Corne Provincial Forest and in the Candle Lake area. North of Prince Albert, moderate damage was recorded at Big River and north to Sled and Dore lakes.

Ground checks during aerial surveys showed light to moderate damage at Lac la Plonge and Smoothstone lakes and in the eastern section at Big Sandy, Little Bear and Whitegull lakes. Discoloration of the foliage appears to be the only damage to the host tree.

8.4.8 Other Noteworthy Diseases.

Other tree diseases, which occurred either commonly or occasionally throughout the district, but were causing very little significant damage are shown in Table 9.

Table 9.
Tree Diseases Which Occurred in the Prince Albert District in 1956 but Caused no Significant Damage

Host	Locality	Causal Organism	Remarks
Jack pine	Home Block	Cronartium comandrae	Comandra stem blister rust
White spruce	Christopher Lake	Chrysomyxa pyrolae	Cone rust - very light
Black spruce	Steep Creek	Peridermium coloradense	Rust broom - general
Jack pine	Home Block	Unknown	Brooming of leaf bud - light
Rosebush	Candle Lake	Phragmidium sp.	Rose rust - light
Willow	Emma Lake	Unknown	Leaf rust - light

8.5 SPECIAL PROJECTS

8.5.1 Special Collections.

Numerous special collections of insect material were made for special studies or projects being conducted at Winnipeg or other laboratories. The type and purpose of these collections are shown in Table 10.

Table 10.
Special Collections and Projects
Prince Albert District - 1956

Type and purpose of collection	No. of Collections	Total time on collections
Jack pine scale collection for R. M. Prentice, Winnipeg	6	2 days
Aphid collection for G. Bradley, Winnipeg	36	3 days
Neodiprion survey and collections for Winnipeg	25	4 days
Jack pine budworm larval collection for Dr. Stehr, Sault Ste. Marie	1	1 day
Mass larval collection of larch sawfly for J. Muldrew, Winnipeg	1	3 days
Mass collection of larch sawfly cocoons for Dr. Coppel, Belleville	1	2 days

8.5.2 Phenological Survey.

A study was undertaken in the Prince Albert District in an effort to measure phenological events, particularly shoot length, in terms of daily variations from common reference points at Winnipeg and Red Rock Lake in the Whiteshell Forest Reserve.

In Saskatchewan, 4 main tree species were chosen at 5 pre-determined areas. Trees selected for measurements varied from 8 to 20 feet high in open-growing sites. A branch of each tree was tagged at eye level for measurements of a marked terminal bud or shoot. Measurements were taken in the latter part of June and early September. Records were kept on supplementary events, such as buds swelling, falling of pollen, flowers and shrubs blooming, etc.

Locations of plots and tree species are shown in the following table.

Table 11.
Phenological Plots

Plot No.	Place	Tree Species	Sec.	Tp.	Rge.	Mer.
1	Crutwell	White spruce Jack pine Tamarack Trembling aspen	21	49	1	W3
2	Fort a la Corne	White spruce Jack pine Tamarack Trembling aspen	33	50	19	W2
3	Candle Lake	White spruce Jack pine Tamarack Trembling aspen	30	54	22	W2
4	Dore Lake	White spruce Jack pine Tamarack Trembling aspen	15	64	9	W3
5	Dumble	White spruce Jack pine Tamarack Trembling aspen	28	55	7	W3

Annual phenological records will be maintained for these plots. The results, which will indicate annual variations in development of the host trees will be presented at 5 year intervals.

8.5.3 Summary of Insect and Tree Disease Collections.

Table 12 presents a summary of collections made from the principal tree species in the Prince Albert District in 1956.

Table 12.

Host	Insect Samples		Tree Disease Samples
	Biology Rangers	Co-Operators	Biology Ranger
W. spruce	82	11	7
B. spruce	98	2	10
T. aspen	34	2	-
B. poplar	8	3	2
Jack pine	62	4	9
Balsam fir	1	0	1

Table 12 continued.

Host	Insect Samples		Tree Disease Samples
	Biology Rangers	Co-Operators	Biology Ranger
Tamarack	26	4	1
Willow	19	3	1
Alder	5	-	-
Chokecherry	16	1	-
W. birch	3	-	-
M. maple	2	2	-
Miscellaneous	3	2	2

8.5.4 Personnel Contacted.

Table 13 lists persons contacted during the season primarily to acquaint them with forest insect and tree disease problems and to obtain assistance in surveys of inaccessible areas.

Table 13.
Personnel Contacted

Name	Position	Address	No. of Contacts
F. Hewitt	Acting Director of Forests	Prince Albert	2
B. A. Matheson	District Superintendent	Prince Albert	*
A. Hansen	District Superintendent	Meadow Lake	1
H. Dempster	District Superintendent	Waskesiu	1
A. Davidson	Asst. to Deputy Mins.	Prince Albert	1
C. Brown	Northern Administrator	Prince Albert	1
E. Dodds	District Supervisor	Prince Albert	1
J. Johnson	District Supervisor	Prince Albert	*
H. Stav	District Supervisor	Prince Albert	1
E. C. Nicholson	D.N.R. Training School	Prince Albert	5
A. Kabzems	Forester	Prince Albert	5
W. Bailey	Forester	Prince Albert	1
C. Kirby	Forester	Prince Albert	*
M. Laird	Forester	Prince Albert	4
D. McKinnon	Forester	Lac la Ronge	2
A. Dickson	Forester	Prince Albert	2
S. Tickner	Forester	Prince Albert	1
O. G. Hornecastle	Forester	Prince Albert	*
R. Haig	Dom. Forest Service	Winnipeg	3
F. Arnold	Field Officer	Prince Albert	*
L. Horne	Field Officer	Holbein	*
D. Wilson	Field Officer	Prince Albert	*
J. Cloutier	Field Officer	La Ronge	*
L. Reznechenko	Field Officer	St. Walburg	1
C. Williams	Field Officer	Dore Lake	1
A. Fremont	Field Officer	Emma Lake	3
H. Randall	Field Officer	Big River	3
D. Hornecastle	Field Officer	MacDowall	5

Table 13 continued.

Name	Position	Address	No. of Contacts
F. Beaudoin	Field Officer	Smeaton	1
C. Ferguson	Field Officer	La Ronge	2
T. Woods	Field Officer	La Ronge	5
C. Schell	Field Officer	Elk House	2
J. Langford	Patrolman	Prince Albert	*
J. Jameson	Dom. Forest Service	Winnipeg	2

* more than 10 contacts

9. ANNUAL REPORT OF FOREST BIOLOGY RANGER NORTHERN DISTRICT OF SASKATCHEWAN

1956

by

B. B. McLeod

INTERIM REPORT - 1956

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

February, 1957

9.1 INTRODUCTION

Forest insect and tree disease surveys were carried out from June 1 to September 15 in the Northern District of Saskatchewan. Special projects were: phenological measurements at three plots; retallies of nine permanent sample plots to determine mortality to tamarack and trembling aspen following outbreaks of the larch sawfly and forest tent caterpillar; special sampling of white and black spruce to determine the damage caused by a complex of insect species attacking foliage and cones at the top of the crown; special collections of aphids for Mr. G. Bradley of the Winnipeg laboratory; and the collection of Neodiprion sawflies for Dr. Lambert of Ottawa.

Twelve hours chartered flying and 13 hours co-operative flying with the Department of Natural Resources were used in aerial surveys of the district.

9.2 REVIEW OF FOREST INSECTS AND TREE DISEASES

A further decline of larch sawfly populations was recorded in 1956. Tamarack stands were generally lightly defoliated, with pockets of moderate and severe defoliation occurring only in the northern part of the region. Populations of the black-headed budworm declined sharply in the southern portion while light defoliation of black spruce tops again occurred in the northern part of the district. Large aspen tortrix and forest tent caterpillar remained at very low population levels throughout the district. An increase in the abundance of the sawfly Neodiprion virginiana was observed in the Lac la Ronge area.

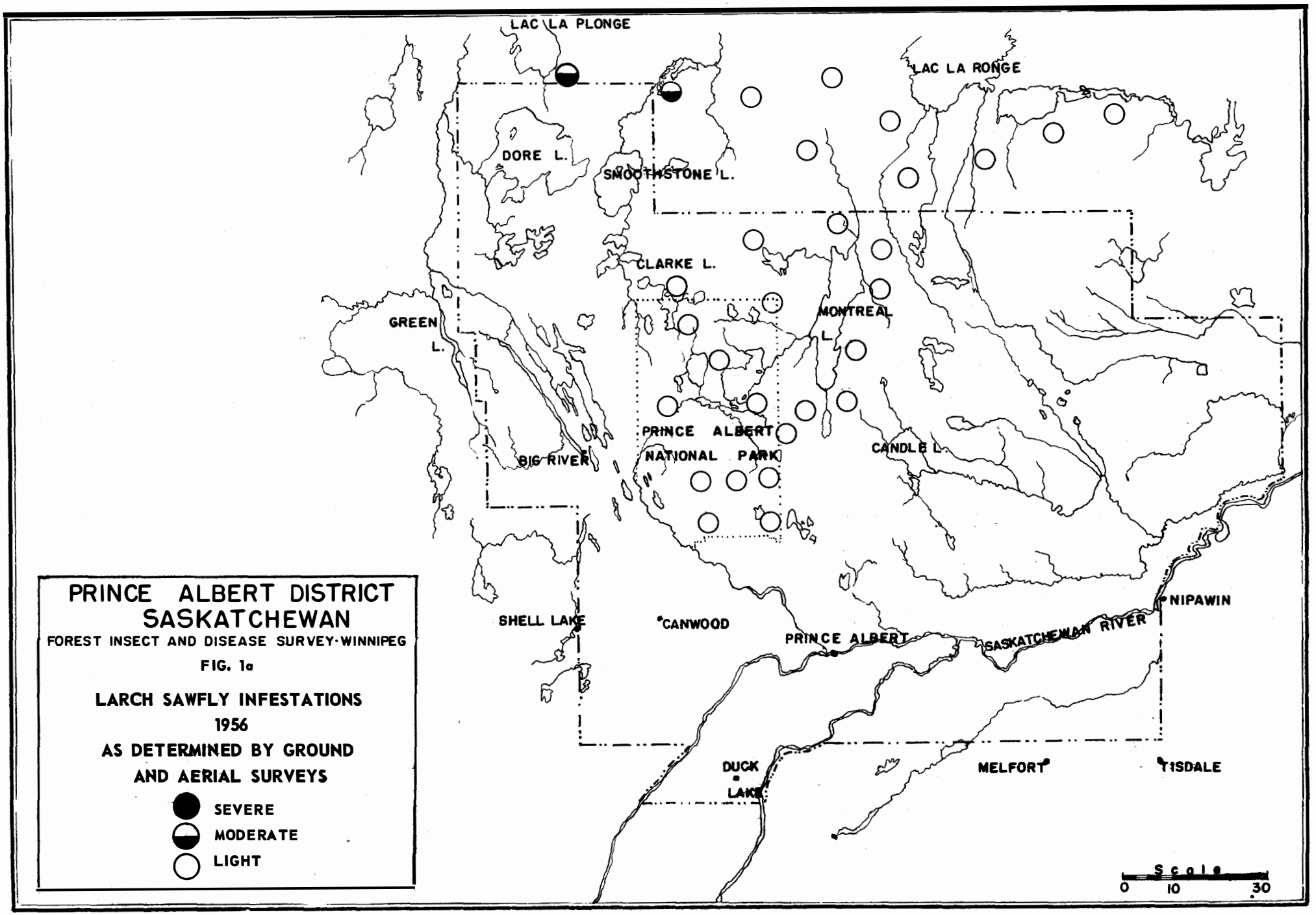
Totals of 403 insect samples and 35 tree disease samples were made in the Northern District. Twelve samples were submitted by co-operators.

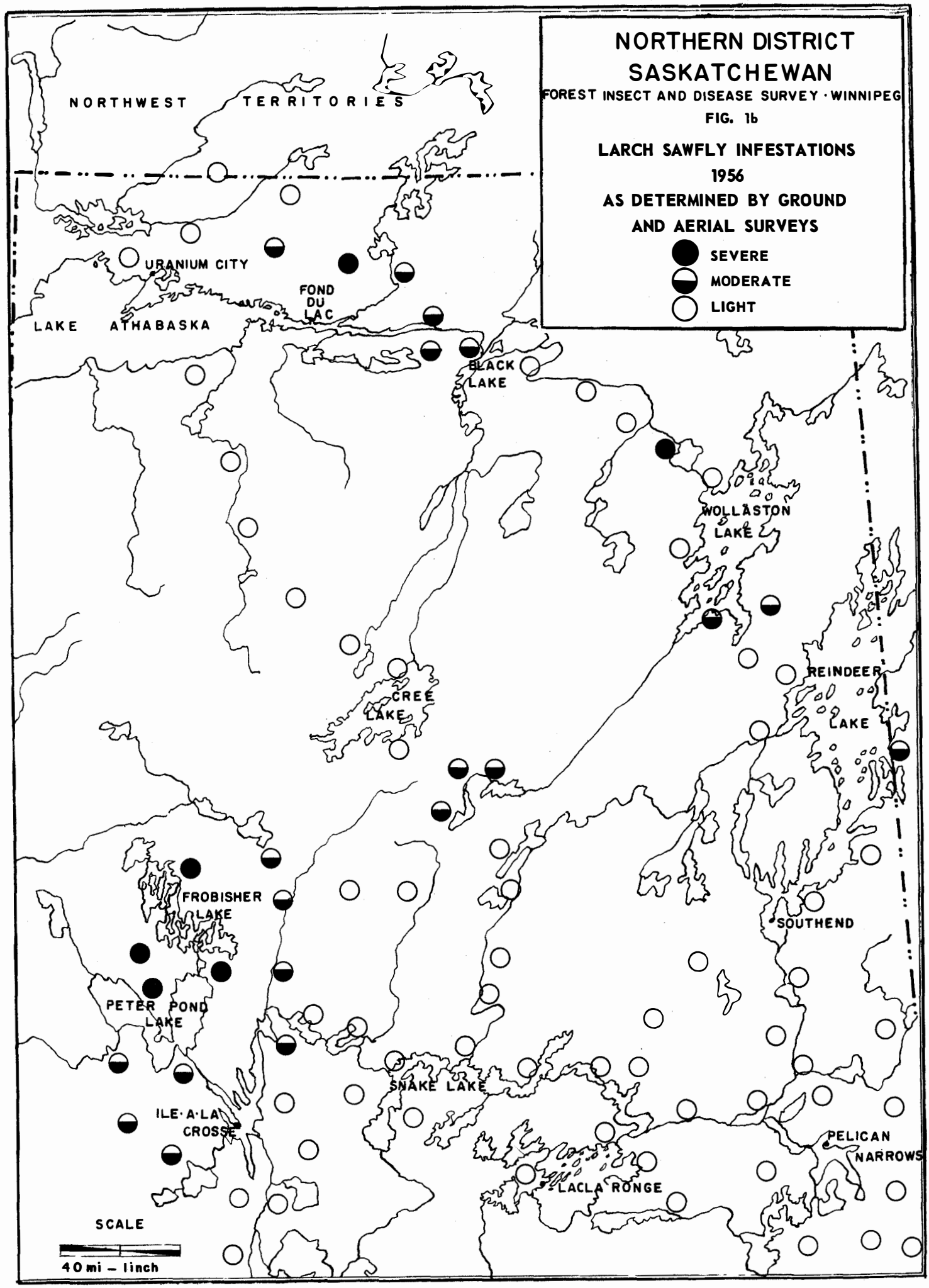
9.3 INSECT CONDITIONS

9.3.1 Larch Sawfly, Pristiphora erichsonii Htg.

A further decrease in larch sawfly populations was evident throughout the district with the exception of two areas, both north of the Churchill River (Figures 1a and 1b). Tamarack stands throughout the Prince Albert National Park suffered only a trace of defoliation. In the south and east portions of the Park, defoliation was confined mainly to reproduction while in the north portion of the Park light defoliation of individual branches was observed.

All tamarack stands in the Northern District south of the Churchill River were lightly defoliated, with the exception of a few pockets of moderate defoliation west of Beauval between Canoe Lake and Buffalo Narrows. North of the Churchill River, varying degrees of larch sawfly defoliation were recorded. Severe defoliation occurred on the west side in the Peter Pond, Churchill, Turnor, Frobisher and Wasekamio lakes regions; moderate defoliation was recorded further north in the Careen Lake and Black Birch Lake areas and extended eastward to the Highrock Lake area. Tamarack stands along the Reindeer River and from Reindeer Lake to Co-Op Point were very lightly defoliated. The same condition existed northwest along the Swan River to Wollaston Lake. Defoliation was moderate from Wollaston Lake along the Fond-du-Lac River to Hatchet Lake where tamarack was completely stripped. Tamarack was lightly defoliated westward along the Fond-du-Lac to Black Lake. Tamarack stands in the Stony


LAC LA PLONGE
LAC LA RONGE
DORE L.
SMOOTHSTONE L.
CLARKE L.
GREEN L.
MONTREAL L.
PRINCE ALBERT NATIONAL PARK
BIG RIVER
CANDLE L.
SHELL LAKE
CANWOOD
PRINCE ALBERT
SASKATCHEWAN RIVER
NIPAWIN
DUCK LAKE
MELFORT
TISDALE
Scale
0 10 30
PRINCE ALBERT DISTRICT
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY-WINNIPEG
FIG. 1a
LARCH SAWFLY INFESTATIONS
1956
AS DETERMINED BY GROUND
AND AERIAL SURVEYS
SEVERE
MODERATE
LIGHT


NORTHERN DISTRICT
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY · WINNIPEG
FIG. 1b
LARCH SAWFLY INFESTATIONS
1956
AS DETERMINED BY GROUND
AND AERIAL SURVEYS
SEVERE
MODERATE
LIGHT
NORTHWEST TERRITORIES
URANIUM CITY
FOND DU LAC
LAKE ATHABASKA
BLACK LAKE
WOLLASTON LAKE
REINDEER LAKE
CREE LAKE
FROBISHER LAKE
PETER POND LAKE
SOUTHEND
SNAKE LAKE
ILE-A-LA CROSSE
PELICAN NARROWS
LACLA RONGE
SCALE
40 mi – 1 inch

Rapids area were moderately defoliated with some reproduction being completely stripped. Defoliation gradually decreased from moderate at Stony Rapids to very light on individual branches along the Saskatchewan - Northwest Territories boundary at Ena Lake.

Examination of tamarack at Ena Lake indicated that 1956 was the first year of larch sawfly attack as there was no evidence of curling of old tamarack shoots due to larch sawfly adult oviposition. Tamarack was very lightly defoliated in the Lake Athabaska - Uranium City area. The same condition existed southward from Lake Athabaska to Cree Lake.

Egg population sampling of the larch sawfly was carried out in four permanent tamarack plots in the district. The infestations on the plots were rated according to the percentage utilization of current tamarack shoots for oviposition by adult larch sawflies. The sample counts and infestation ratings from each plot are shown in Table 1.

Table 1.
Sample Counts and Infestation Ratings on Four
Permanent Tamarack Plots
Northern District of Saskatchewan - 1956

Plot No.	Location					Infestation Rating		
	Place	Sec.	Tp.	Rge.	Mer.	No. of shoots examined	No. curled	Rating
111	Mayview	24	53	2	W3	50	0	light
116	Waskesiu	28	57	1	W3	90	3	light
115	Skunk Creek	13	62	24	W2	50	0	light
101	Lac la Ronge	6	70	22	W2	70	2	light

Since 1950, four permanent plots have been established in representative tamarack stands in Northern Saskatchewan for the purpose of determining tamarack mortality caused by repeated attacks of the larch sawfly. The plots ranged from 1/5 to 1/2 acre in size. All living and dead trees on the plots were tallied the year that the plot was established. Annual defoliation records were maintained throughout the infestation period on ten sample trees in each plot. The plots were retallied in 1956 to determine the amount of tree mortality. The percentages of losses by basal area, together with the annual defoliation records for the plots are shown in Table 2.

Table 2.

Summary of Permanent Tamarack Plots in the Northern District of Saskatchewan showing Percentage Dead Trees by Basal Area and History of Larch Sawfly Defoliation during Period shown by Tally Years (Percentage Wood Loss being the Cumulative Mortality)

Plot No.	Tally year	Tamarack only: d.b.h. Living trees Range	d.b.h. Living trees Average	d.b.h. Dead trees Range	d.b.h. Dead trees Average	Basal area Living	Basal area Dead	Basal area % loss	Total all species Basal area Living	Total all species Basal area Dead	Total all species Basal area % loss	Defoliation history of tamarack Year	Defoliation history of tamarack %	Remarks
111	1950	1-11	3.6	1-9	1.6	31.582	3.742	10.59	32.681	3.782	10.37	1950	15	Bog flooded most of summer of '55, pools of surface water all other times, stand infected with "larch canker", bark beetles present in all dead trees
												1951	66.5	
												1952	74	
												1953	34.5	
												1954	35.5	
												1955	3.4	
111	1956	1-9	3.4	1-8	2.3	20.516	4.244	17.14	21.679	4.303	16.56	1956	0	
												1951	trace	No bark beetles present. Swamp always wet with pools of surface water
												1952	M	
												1953	S	
101	1954	1-5	2.19	1-2	2.0	14.892	.022	.15	24.151	.463	1.88	1954	100	
												1955	51.5	
101	1956	1-7	2.4	1-6	1.6	9.326	4.380	31.96	18.320	4.578	20.00	1956	8	
115	1954	1-5	2.3	-	-	6.386	0.0	0.0	13.052	0.0	0.0	1954	89	Stand on gravel, sand and clay site, well drained, sparse undergrowth
												1955	4.1	
115	1956	1-6	3.7	1-5	2.1	5.492	3.382	38.11	16.958	3.451	16.91	1956	.8	
116	1954	1-8	4.0	1-7	5.8	9.496	.746	7.28	17.425	.882	4.82	1954	43.5	Soil damp, heavy growth of alder
												1955	13.7	
116	1956	1-9	4.0	1-8	3.8	9.444	1.404	12.94	16.599	1.513	8.35	1956	2.3	

9.3.2 A Species Complex Attacking Black Spruce Tops and Cones.

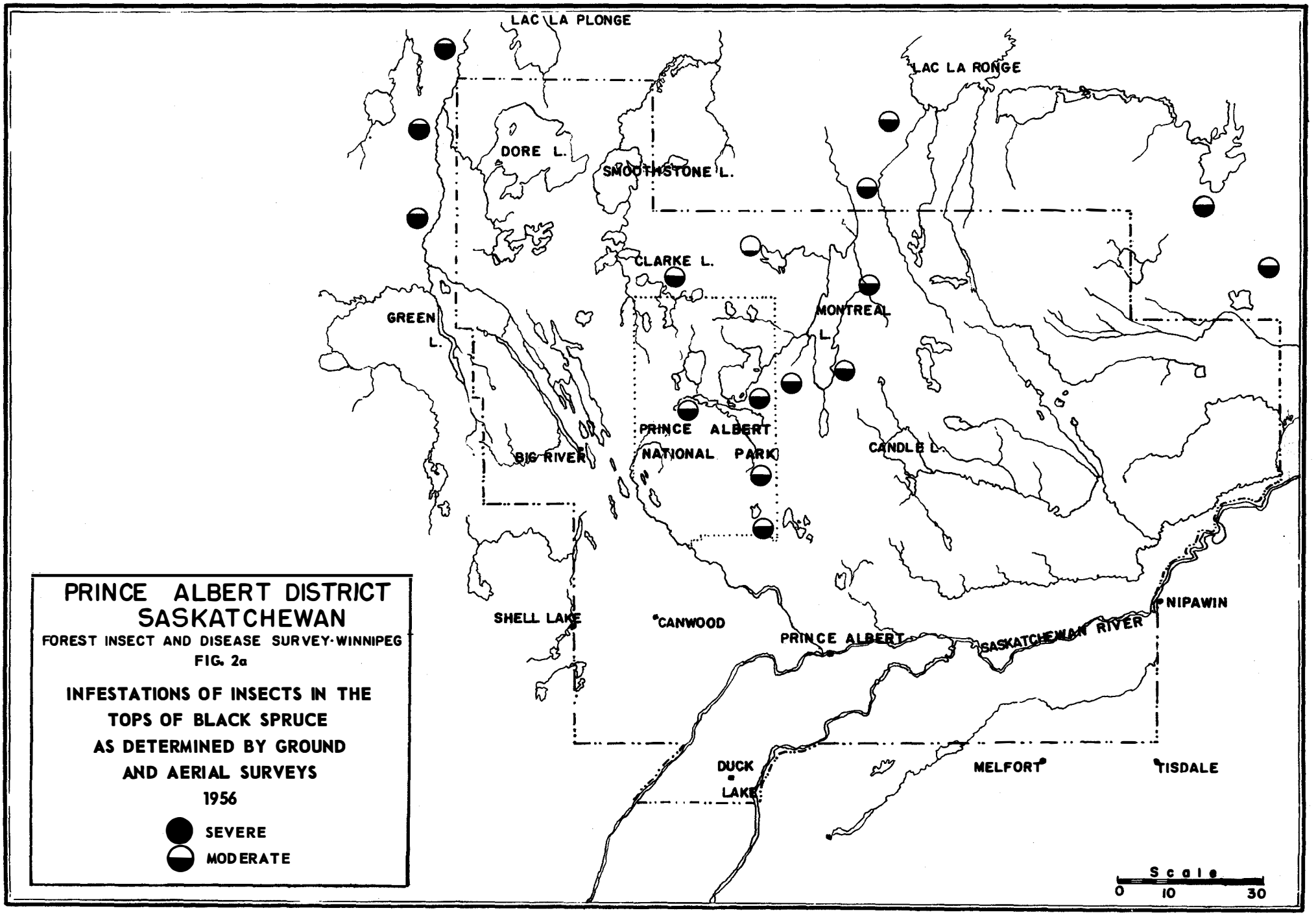
Surveys in 1956 showed that a complex of insect species were attacking the top foliage and cones of club-topped black spruce throughout the boreal forest region of Saskatchewan (Figures 2a and 2b). Although club-topped trees were the preferred host, some of the defoliators were also found in considerable numbers in open-topped trees; a notable example of this was the black-headed budworm, Acleris variana.

Since 1955, thirty-six species of insects have been found in the tops and cones. Of these, six species appear to be the most important. They are: Archips alberta, Herculia thymetusalis, Dioryctria abietella, Epizeuxis aemula, Acleris variana and Gelechiid spp.

Some changes in the status of some of the insect species that were present in 1955 were noted in 1956. Populations of Acleris variana and Archips alberta were lower while Herculia thymetusalis, Dioryctria abietella and Gelechiid spp. populations increased. The most notable change was the sudden decline of black-headed budworm populations. Several species of needle miners formed part of the complex. These became most active in early August. Egg masses of Archips alberta on needles and cones were found in late August and early September. Winter examination of infested tops revealed that Archips alberta and needle miner larvae overwinter in an early instar in mined needles. Herculia thymetusalis larvae overwinter in various instars in silken hibernaculae buried in the cones, frass and dead needles in the centre of the crown. The following list based on field observations and insectary rearing studies shows the apparent food preference of 6 major species.

Acleris variana	foliage
Archips alberta	foliage
Herculia thymetusalis	foliage and cones
Dioryctria abietella	cones
Gelechiid sp.	foliage

The following table shows the intensity of defoliation and degree of cone damage to black spruce caused by the species complex at various points throughout the Prince Albert National Park and Northern District of Saskatchewan.



PRINCE ALBERT DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY-WINNIPEG

FIG. 2a

INFESTATIONS OF INSECTS IN THE TOPS OF BLACK SPRUCE AS DETERMINED BY GROUND AND AERIAL SURVEYS 1956

● SEVERE

◒ MODERATE

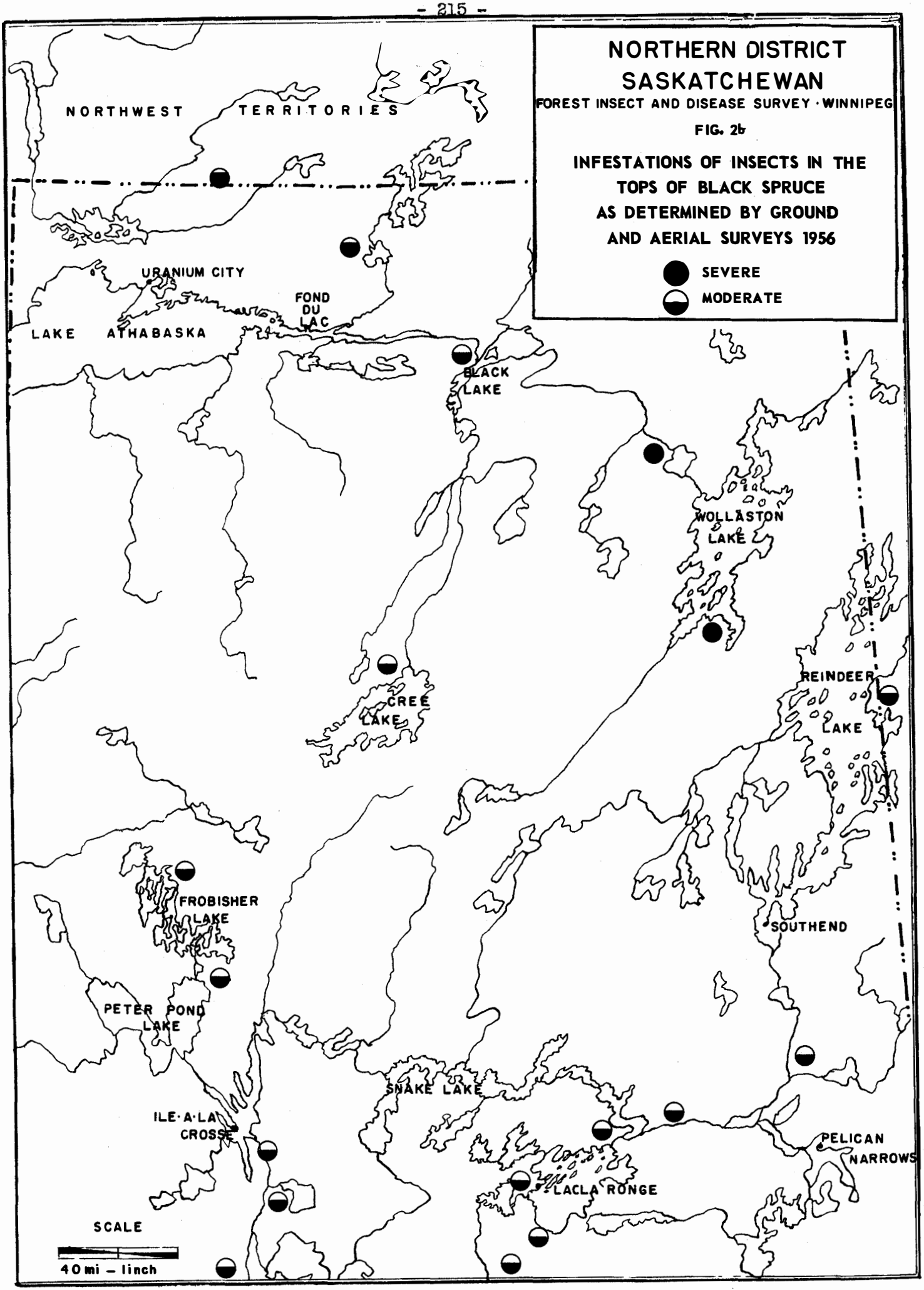

NORTHERN DISTRICT
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY · WINNIPEG
FIG. 2b
INFESTATIONS OF INSECTS IN THE TOPS OF BLACK SPRUCE AS DETERMINED BY GROUND AND AERIAL SURVEYS 1956
SEVERE
MODERATE
NORTHWEST TERRITORIES
URANIUM CITY
FOND DU LAC
LAKE ATHABASKA
BLACK LAKE
WOLLASTON LAKE
CREE LAKE
REINDEER LAKE
FROBISHER LAKE
PETER POND LAKE
SOUTHEND
SNAKE LAKE
ILE-A-LA CROSSE
LACLA RONGE
PELICAN NARROWS
SCALE
40 mi – 1 inch

Table 3.
Estimates of Defoliation and Cone Damage Caused by a Complex of Insect Species Attacking Black Spruce in Northern Saskatchewan 1956

Location	Grid	Defoliation	Damage to Cone Crop
Waskesiu	8-074-323	very light	moderate
Nikik Lake	8-076-324	very light	moderate
Lac La Ronge	8-087-347	light	moderate
Beauval	8-053-345	very light	mod.-severe
Fort Black	8-057-348	very light	mod.-severe
Sandy Lake	8-083-323	very light	moderate
Bittern Creek	8-076-324	very light	mod.-severe
Lac La Ronge	8-080-342	very light	mod.-severe
Trade L. (Churchill R.)	7-016-349	very light	moderate
Reindeer River	7-024-355	very light	mod.-severe
Co-Op Point (Reindeer L.)	7-035-377	light	mod.-severe
Wollaston Lake	7-032-396	mod-severe*	severe
Hatchet L.(Fond du Lac R.)	7-021-404	light	severe
Stony Rapids	8-073-415	light-moderate	moderate
Fontaine Lake	8-069-423	light	moderate
Ena Lake (Sask.-NWT boundary)	8-054-427	light-moderate	moderate
Cree Lake	8-070-387	light-moderate	moderate
Foster Lakes	8-079-372	light-moderate	moderate
McTavish Lake	8-080-358	light-moderate	moderate
Wildnest Lake	7-031-342	light	moderate
Deschambault Lake	7-019-338	very light	moderate
O'Leary Lake	7-031-328	very light	moderate
Mirond Lake	7-027-343	very light	moderate
Wasekamino Lake	8-050-369	light	moderate
Churchill Lake	8-053-359	light	moderate

* high populations of Pikonema alaskensis were also present in this area.

In addition to the general sampling, special sampling of "club-topped" black spruce was employed at three points in the district in order to determine the insect species present, their abundance, defoliation and damage, and the part of the tree attacked by each species. One branch was removed from each of the lower and mid crown levels and 3 branches from the upper crown level of each tree examined. Insect species were recorded by "branch area" on which they were feeding; (1) insects feeding on new foliage, (2) insects feeding one cones, (3) insects feeding on old foliage, and (4) insects for which part of plant attacked could not be determined.

The areas sampled and the results of the examinations are shown in Table 4.

Table 4.

Percentage of Defoliation and Degree of Cone Damage to "Club-topped" Black Spruce and White Spruce Caused by a Complex of Insect Species Northern Saskatchewan - 1956

Tree species	Location	Examination	Sample branch from lower crown		Sample branch from mid-crown		Sample branch from upper crown		Av.No. of cones per sample branch	Av. % of cones damaged
			Area sq.in.	% defol.	Area sq.in.	% defol.	Area sq.in.	% defol.		
Black spruce	Nikik L.	spring	764	0	288	0	67	5	15	85
	Nikik L.	fall	432	0	209	0	131	5	13	78
Black spruce	Lac La Ronge	spring	161	0	297	0	57	5	68	53
	Lac La Ronge	fall	273	0	408	0	112	33	118	63
White spruce	Waskesiu	spring	338	5	476	5	482	3	43	52
	Waskesiu	fall	1176	0	1140	0	131	0	19	52

9.3.3 Black-headed Budworm, Acleris variana (Fern.).

Black-headed budworm populations declined noticeably throughout the Northern District in 1956. In the Lavallee Lake area of Prince Albert National Park and the Lac la Ronge area of the Northern District, populations were low and defoliation was recorded as very light. Black and white spruce and balsam fir in the above two areas had been moderately defoliated in 1955. Somewhat higher populations and light defoliation of black spruce tops occurred farther north along the Fond du Lac River, and the Sask.-NWT boundary.

9.3.4 Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.).

The yellow-headed spruce sawfly infestation at Montreal Lake, sec. 28, tp. 58, rge. 25, W2nd subsided in 1956 and only very light defoliation was recorded. Moderate to severe defoliation of black spruce was again recorded on Hungry Island in Wollaston Lake with some tree mortality observed this year (Figures 4, 5). Black spruce on several small islands adjacent to Hungry Island have also suffered heavy mortality due to severe defoliation for the past two to three years. Larvae collected from this area were heavily parasitized. The parasite, Itoplectus conquisitor was abundant in the area but this species is not a recognized parasite of the sawfly.

9.3.5 The American Poplar Leaf Beetle, Gonioctena americana (Schaeff.).

American poplar leaf beetle caused moderate defoliation to regeneration aspen along the south and east boundaries of Prince Albert National Park, (Figures 6 and 7). Small pockets of light to moderate defoliation were also recorded at Skunk Creek (sec. 13, tp. 62, rge. 24, W2nd mer.) and at aspen plot #102 (sec. 5, tp. 70, rge. 22, W2nd mer.). Pockets of moderate defoliation were recorded along the Beauval road from Beauval to Fort Black on Lac Ile a La Crosse. This insect was not found north of the Churchill River.

9.3.6 Willow Leaf Beetle, Galerucella decora (Say).

Larvae and adults of the willow-leaf beetle severely skeletonized willow foliage at various points throughout the Prince Albert National Park and Northern District south of the 57th parallel (Figures 3a and 3b).

In Prince Albert National Park, willow suffered severe skeletonizing along #2 highway from the southeast entrance to Waskesiu. Severe skeletonization took place in the central portion of the Park northwest of Sandy Lake to Kingsmere Lake and moderate defoliation northward to Lavallee Lake and the north boundary. In the Northern District, severe defoliation was recorded from Bittern Creek to Molanosa and in an area west of Montreal Lake from Weyakwin Lake to Smoothstone, Swan and Emmeline lakes. Moderate skeletonization occurred around Buffalo Narrows and from Black Bear Island Lake to Trade Lake on the Churchill River. Between 75 and 100 per cent of the willow was skeletonized along the Reindeer River from its junction with the Churchill River on the south to Deep Bay on Reindeer Lake on the north.

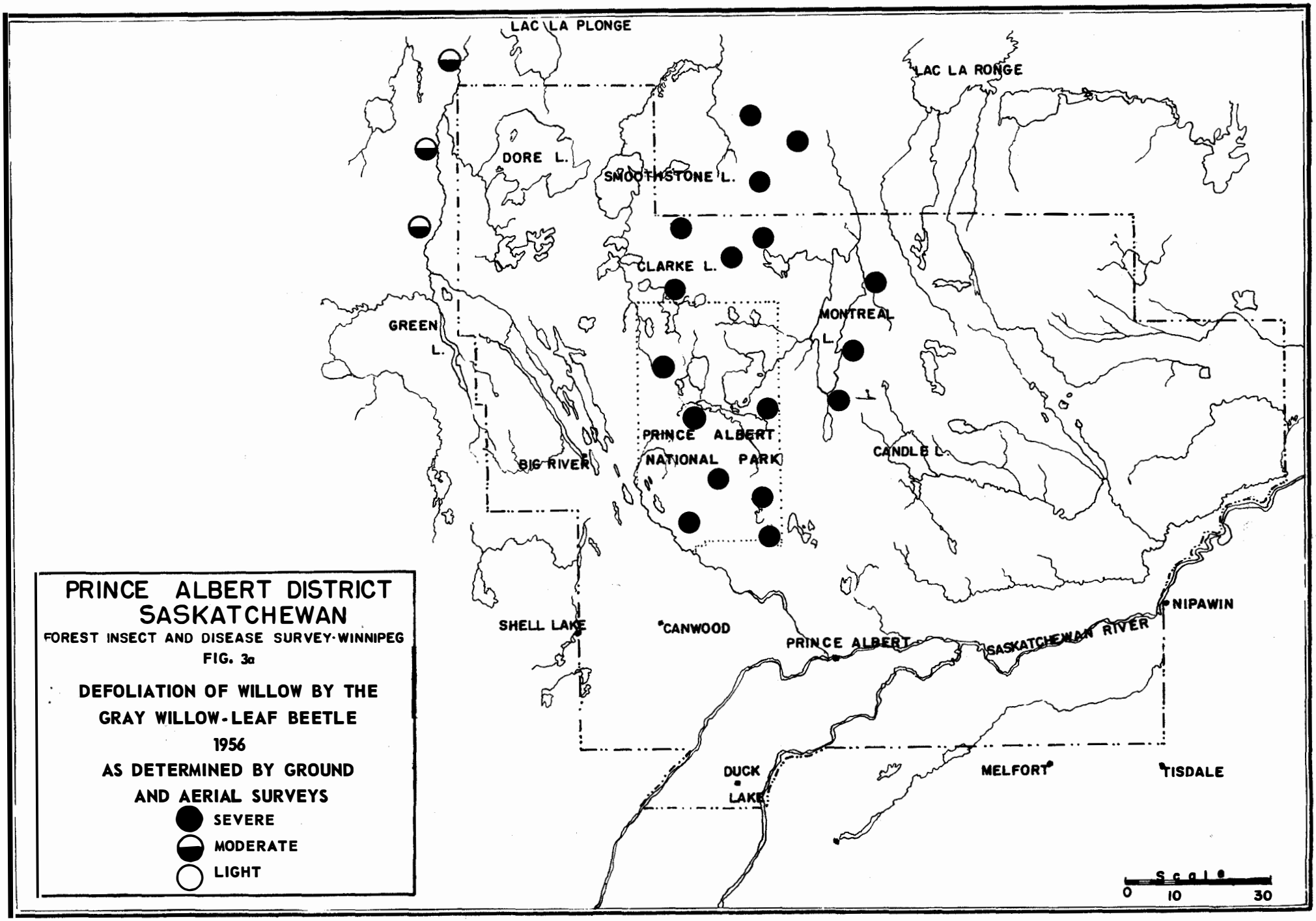
Adults of the grey willow-leaf beetle became active around the tenth of June and caused light feeding damage of foliage. Larvae, which were recorded in early July, caused severe skeletonizing in the above mentioned areas. Adults became active again in the fall (up to September 15) and caused light skeletonizing of partially refoliated willow.

Fig.4

Fig.5

Figs.4 and 5. Black Spruce Defoliated by Pikonema alaskensis. Wollaston Lake, Sask.

Photographs by B. McLeod. Negative Numbers, Fig.4, W-468 and Fig.5, W-469



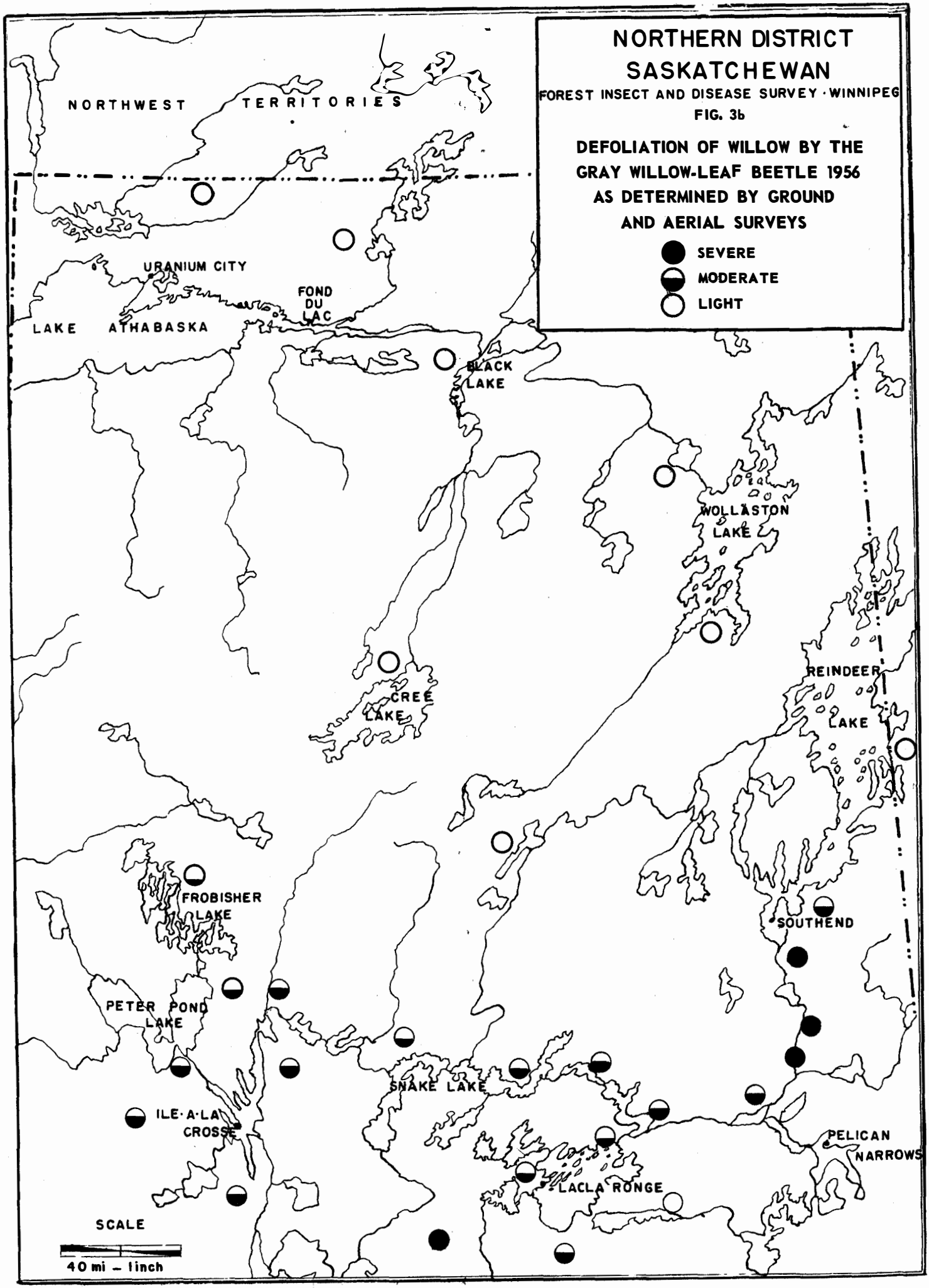
PRINCE ALBERT DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY-WINNIPEG

FIG. 3a

DEFOLIATION OF WILLOW BY THE GRAY WILLOW-LEAF BEETLE 1956 AS DETERMINED BY GROUND AND AERIAL SURVEYS

- SEVERE
- MODERATE
- LIGHT


NORTHERN DISTRICT
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY · WINNIPEG
FIG. 3b
DEFOLIATION OF WILLOW BY THE GRAY WILLOW-LEAF BEETLE 1956 AS DETERMINED BY GROUND AND AERIAL SURVEYS
SEVERE
MODERATE
LIGHT
NORTHWEST TERRITORIES
URANIUM CITY
FOND DU LAC
LAKE ATHABASKA
BLACK LAKE
WOLLASTON LAKE
CREE LAKE
REINDEER LAKE
FROBISHER LAKE
SOUTHEND
PETER POND LAKE
SNAKE LAKE
ILE-A-LA CROSSE
PELICAN NARROWS
LACLA RONGE
SCALE
40 mi – 1 inch

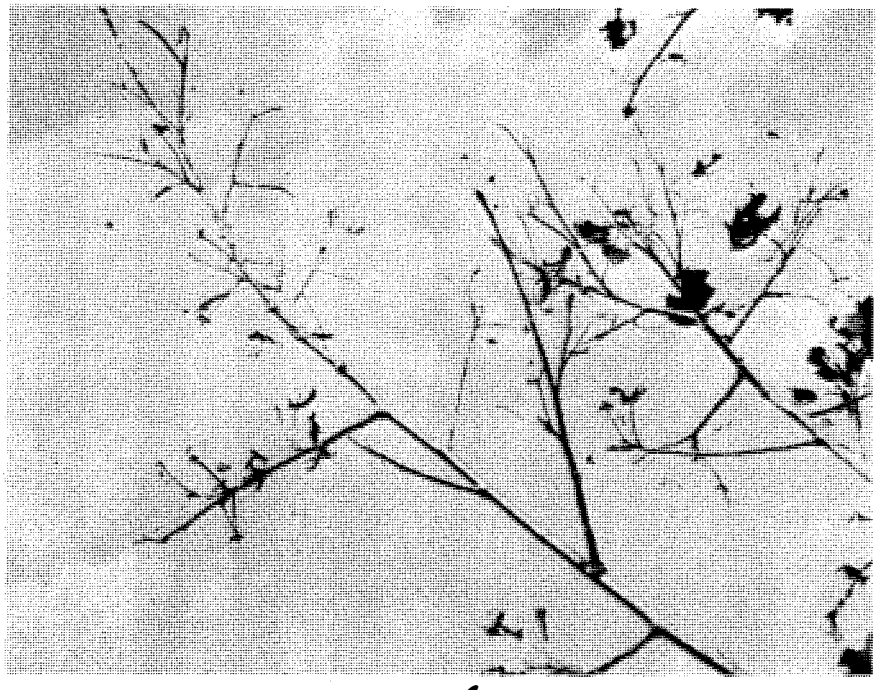


Fig.6

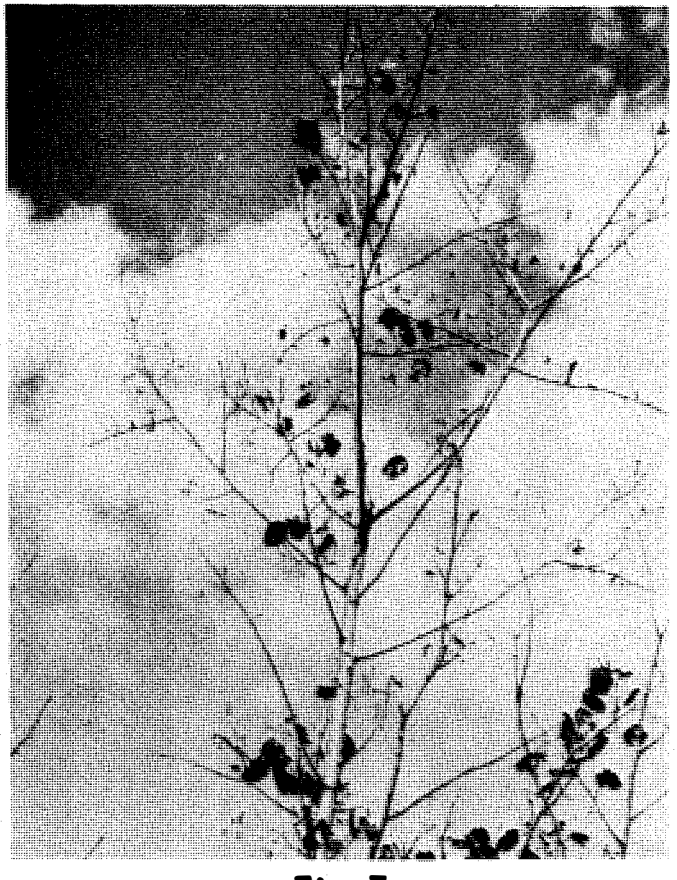


Fig.7

Figs.6 and 7. Defoliation of Aspen Regeneration by Gonioctena americana.
Photographs by B. McLeod
Negative Numbers W-470 and W-471

9.3.7 A Pine Sawfly, Neodiprion virginiana (Roh.).

This insect increased in abundance and caused heavier defoliation in the Lac La Ronge area in 1956. Jack pine around the La Ronge townsite was light to moderately defoliated and trees on the islands in the lake were lightly attacked. Numerous colonies of this sawfly were noted in Potato River area at the south end of Lac La Ronge. Light feeding damage was recorded on the north shore of Lac La Ronge in the vicinity of Kinderdine Island and the Montreal River. This sawfly was observed feeding mainly on the old needles of jack pine but an occasional cluster was found on the current needles. Egg scars were readily found on old needles (Figure 8).

9.3.8 A Sawfly, Pleroneura borealis (Felt.).

This insect was found attacking the new shoots of balsam fir around Waskesiu Lake and the southeast shore of the Hearts Lakes in Prince Albert National Park. The destruction of new shoots in these areas ranged from 20 - 35 per cent. Light damage was recorded along the Montreal River between Bigstone Lake and Lac La Ronge and between Lac La Ronge and Iswatikan Lake in the Northern District.

9.3.9 Pitch Nodule Maker, Petrova albicapitana (Busck.).

The pitch nodule maker was present in jack pine stands throughout the Northern District and Prince Albert National Park. A light infestation was recorded in sec. 19, tp. 56, rge. 1, W3rd mer. in the Park. The most northerly point from which this species has been taken to date is at the north end of Ena Lake along the Saskatchewan - Northwest Territories boundary. Examination of jack pine regeneration at this point revealed a very light infestation this year, but numerous old nodules from previous years were found.

9.3.10 The Tube Moth, Argyrotaenia pinatubana (Kearf.).

This insect was found only in the northern portion of the district. Low populations were recorded at Frobisher, Churchill and Wasekamio lakes on the west side. Light defoliation was observed at Ena and Fontaine lakes on the Saskatchewan - NWT boundary.

9.3.11 Spiny Elm Caterpillar, Nymphalis antiopa L.

A few widely scattered collections of this insect were made in 1956. Moderate defoliation of willow and balsam poplar regeneration occurred on islands in Lac La Ronge and along the Montreal River between La Ronge and Iswatikan Lake. In all cases the defoliation was confined to a few shrubs. One collection of this species was received from Field Officer E. Shannon of Uranium City.

9.3.12 White Pine Weevil, Pissodes strobi Peck.

The white-pine weevil remained at low population levels. The leaders of scattered white and black spruce saplings were attacked in the Prince Albert National Park and scattered black spruce were damaged in the Northern District. The most northerly collection point of this species to date is Ena Lake on the Saskatchewan - NWT boundary.

Fig.8

Egg Scars by the Sawfly Neodiprion virginiana on Jack Pine Needles.

Photograph by B. McLeod.
Negative Number W-464

9.3.13 Jack-pine Budworm, Choristoneura pini Free.

Low populations and very light defoliation were recorded in the Prince Albert National Park and Pine Creek area of the Northern District. Elsewhere in the district, the jack-pine budworm was either absent or at such low levels that it could not be detected using regular sampling techniques.

9.3.14 Spruce Budworm, Choristoneura fumiferana (Clem.).

A single collection of this insect was made in 1956. It was taken from balsam fir on an island in Lac La Ronge.

9.3.15 Large Aspen Tortrix, Choristoneura conflictana (Wlk.).

Large aspen tortrix larvae were present in all aspen stands examined south of Lac La Ronge. However, populations remained at a low level and defoliation was very light.

9.3.16 Forest Tent Caterpillar, Malacosoma disstria Hbn.

A single collection of tent caterpillar was made at Bluebell tower near Waskesiu in Prince Albert National Park.

9.3.17 Eastern Larch Beetle, Dendroctonus simplex Lec.

Examination of dead and dying tamarack near Sandy Lake in Prince Albert National Park revealed a high population of Dendroctonus simplex. Adults were active and numerous larvae were still present when examined on the 15th of September. Dying tamarack was examined further north at Skunk Creek and Lac La Ronge, but no bark beetles were found in this area.

9.3.18 A Sawfly, Xyelid sp.

A very light local infestation of this shoot-boring sawfly occurred at Birch Creek, sec. 22, tp. 61, rge. 24, W-2nd mer. The larvae were found boring in the new shoots of regeneration jack pine, causing a gall. This is the first record of this sawfly on jack pine in the Northern District and surveys throughout the district indicate that the infestation was confined to Birch Creek.

9.3.19 Aspen Blotch Miner, Lithocolletis salicifoliella Chamb.

A small moderate infestation of this leaf miner was observed near Potato Lake in the Northern District. The infestation was confined to trembling aspen regeneration.

9.3.20 The Leaf Beetle, Chrysomela interrupta Auct.

This beetle was reported from widely scattered points in the district. Light defoliation of alder occurred at Waskesiu Lake, Skunk Creek, Lac La Ronge and Hatchet Lake.

9.3.21 Spruce Root Weevil, Hylobius sp.

This weevil was found feeding on the roots of white spruce regeneration along the Montreal River north of Lac La Ronge and on jack pine roots near Beauval. Some tree mortality was observed in these areas but the infestation was recorded as light.

9.3.22 Balsam Gall Midge, Itonida balsamicola (Lint.).

The balsam gall midge lightly infested balsam fir regeneration in the Waskesiu - Hearts Lakes area and the Lac La Ronge area of northern Saskatchewan (Figures 9, 10, 11 and 12). The midge causes a swelling about 3 mm. in diameter at the base of the needle and eventually some needles will drop. However no extensive needle drop has as yet been observed in the infested areas.

9.3.23 Other Noteworthy Insects.

The following table contains a list of other insects which occurred commonly throughout the district but were of minor importance. The table indicates the species, its relative abundance, host and location.

Table 5.
Other Noteworthy Insects
Northern District of Saskatchewan
1956

Insect	Location	Host	Infestation Rating
Neodiprion nanulus nanulus	Wollaston L. Lac la Ronge	jP	trace
Tetralopha asperatella	La Ronge P.A.N.P.	tA	trace
Nymphalis nilberti	La Ronge Waskesiu	nettles	light
Halisidota maculata	Scattered over district	tA, W, B	very light
Epizeuxis aemula	"	bS, bF	very light
Pikonema dimmockii	"	bS, wS	trace
Chermes abietis	"	bS	light
Dichelonyx backi	Beauval Ft. Black	W, tA, B	light
Neodiprion abietis	Waskesiu Lac La Ronge	wS	trace
Mordwilkoja vagabunda	Scattered over district	tA	trace
Sciaphila duplex	Lac La Ronge P.A.N.P.	tA	trace
Archips rosaceana	Waskesiu	tA	trace
Anoployns luteipes	Scattered over district	tL	trace
Galerucella cavicollis	Lac La Ronge	pCh	light
Feralia jocosa	Lac La Ronge	wS	trace

Fig.9

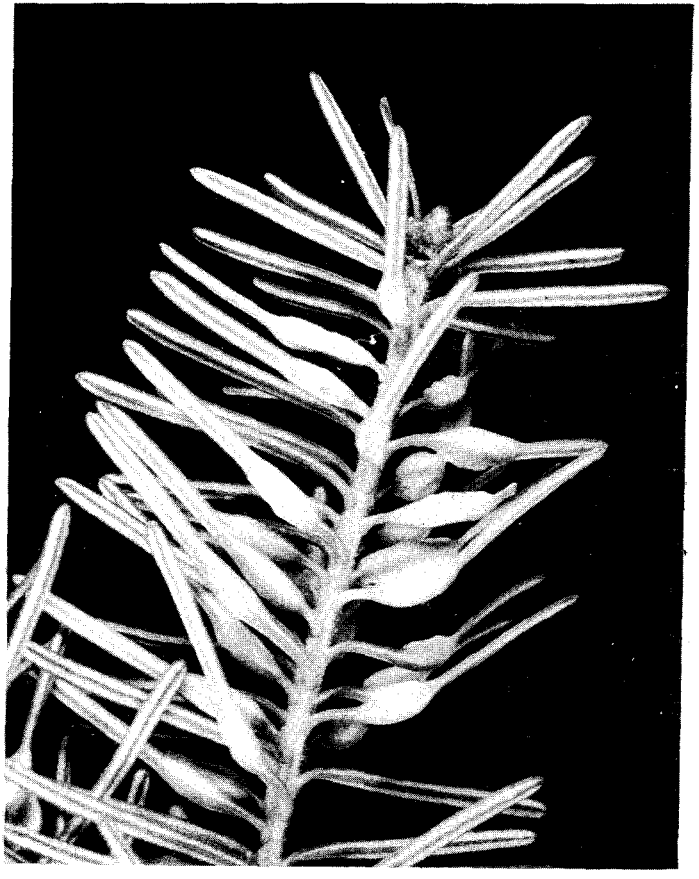


Fig.10

Figs.9 and 10. Balsam Fir Needles Showing Heavy Infestation of Itonida balsamicola. Waskesiu, Sask.

Photographs by B. McLeod.
Figure Numbers W-472
W-473

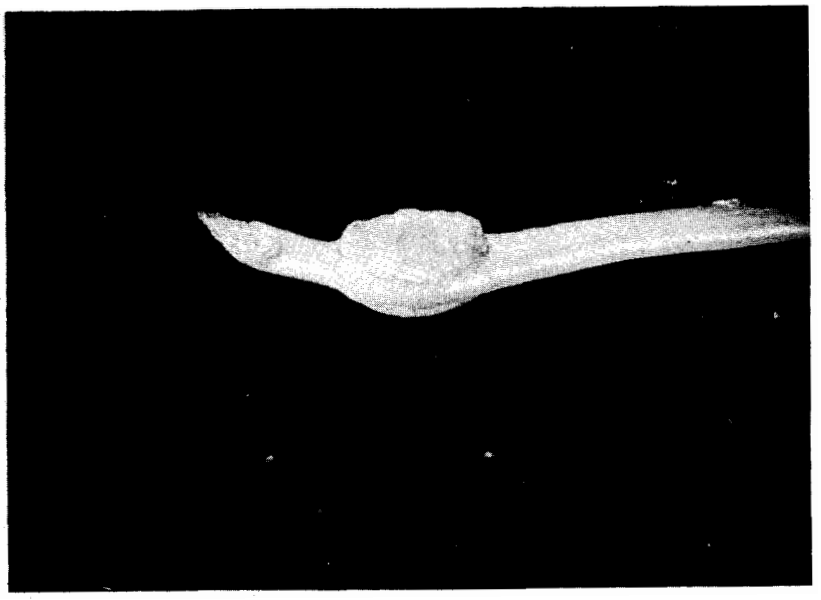


Fig.11

Balsam Needle Showing Gall Caused by Itonida balsamicola.

Fig.12

Parasitised Larvae of Itonida balsamicola Extracted from Gall.

Photographs by B. McLeod.
Negative Numbers W-474
W-475

Table 5 continued

Insect	Location	Host	Infestation Rating
Semiothisa sexmaculata	Scattered over district	tL	trace
Incisalia niphon	Lac La Ronge	jP	trace
Nycteola frigidana	P.A.N.P. Lac La Ronge	bPo, W	trace

9.4 TREE DISEASE CONDITIONS

9.4.1 Yellow-Witches Broom on Black Spruce, Peridermium coloradense.

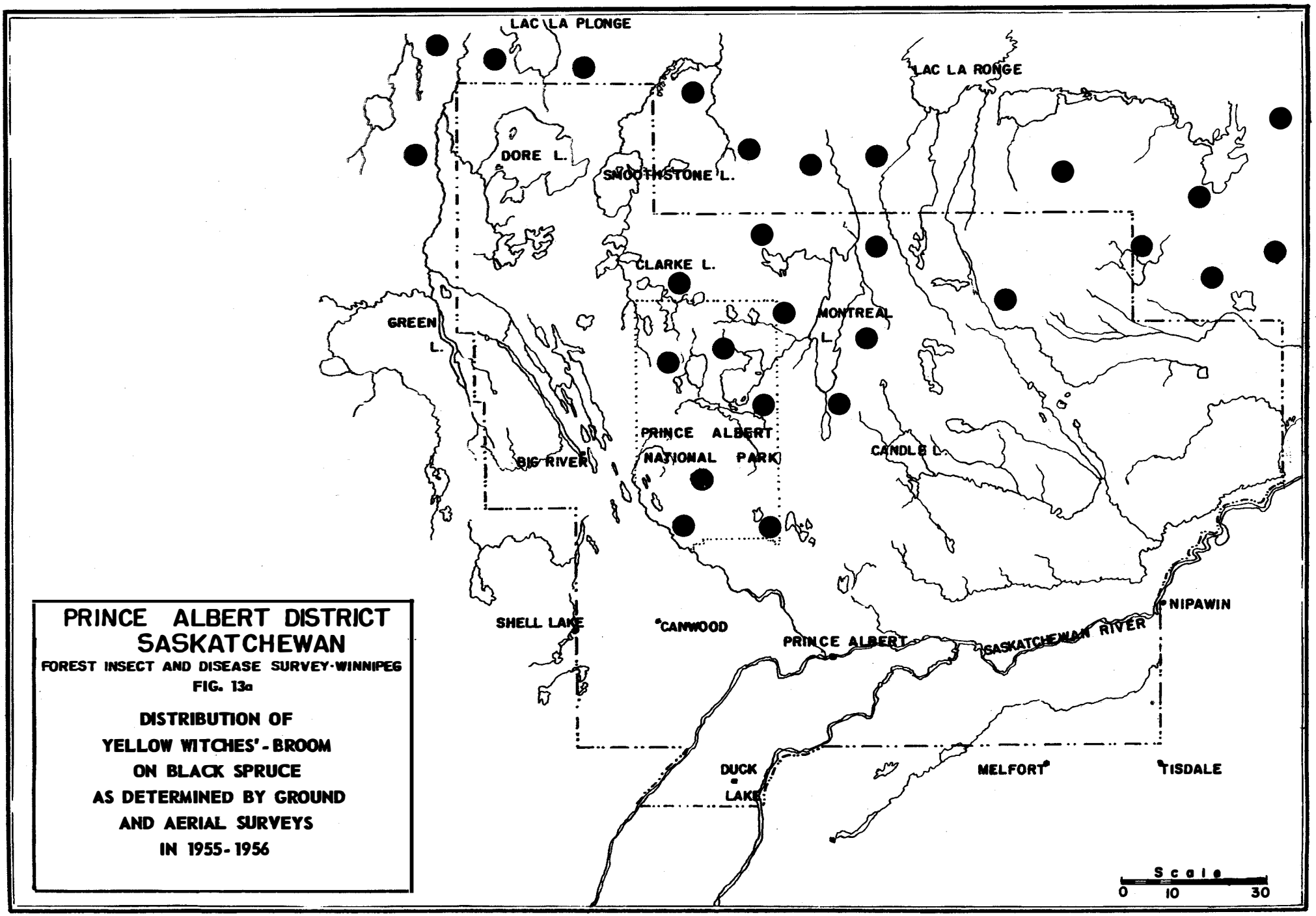
Aerial and ground surveys in 1956 indicated that this rust broom attacked black spruce in all parts of the Northern District (Figures 13a and b). The following table lists the areas where yellow-witches broom was collected.

Table 6.
Occurrence of Yellow-Witches' Broom on Black Spruce
Northern Saskatchewan - 1956

Place	Location	Remarks
Waskesiu	8-074-323	Common on white and black spruce
Montreal Lake	8-075-325	Many brooms observed
Beauval	8-053-345	Many brooms observed
Lac La Ronge	8-087-347	Common in the area
Reindeer Lake	7-035-377	Occasional
Hatchet Lake	7-021-404	Brooms observed on black spruce
Stony Rapids	8-073-415	Brooms on black spruce
Fontaine Lake	8-069-423	Very common in area
Ena Lake	8-054-427	Numerous brooms observed
Cree Lake	8-070-387	One broom collected
Foster Lake	8-079-372	Many brooms in area
Trade Lake	7-016-349	Common all along Churchill River
Wollaston Lake	7-032-396	Common in area
Churchill Lake	8-053-359	Many brooms observed in area
Turnor Lake	8-050-367	Many brooms on islands
Wasekamio Lake	8-050-369	Few brooms in black spruce swamps

9.4.2 Needle Rust on Conifers, Chrysomyxa sp.

This needle rust attacked white and black spruce foliage throughout the entire Northern District. The infections were not as heavy as in previous years and generally, the foliage of spruce was only lightly attacked. Areas of most severe infection were Weyakwin Lake, Skunk Creek, Churchill Lake and around the Foster Lakes.

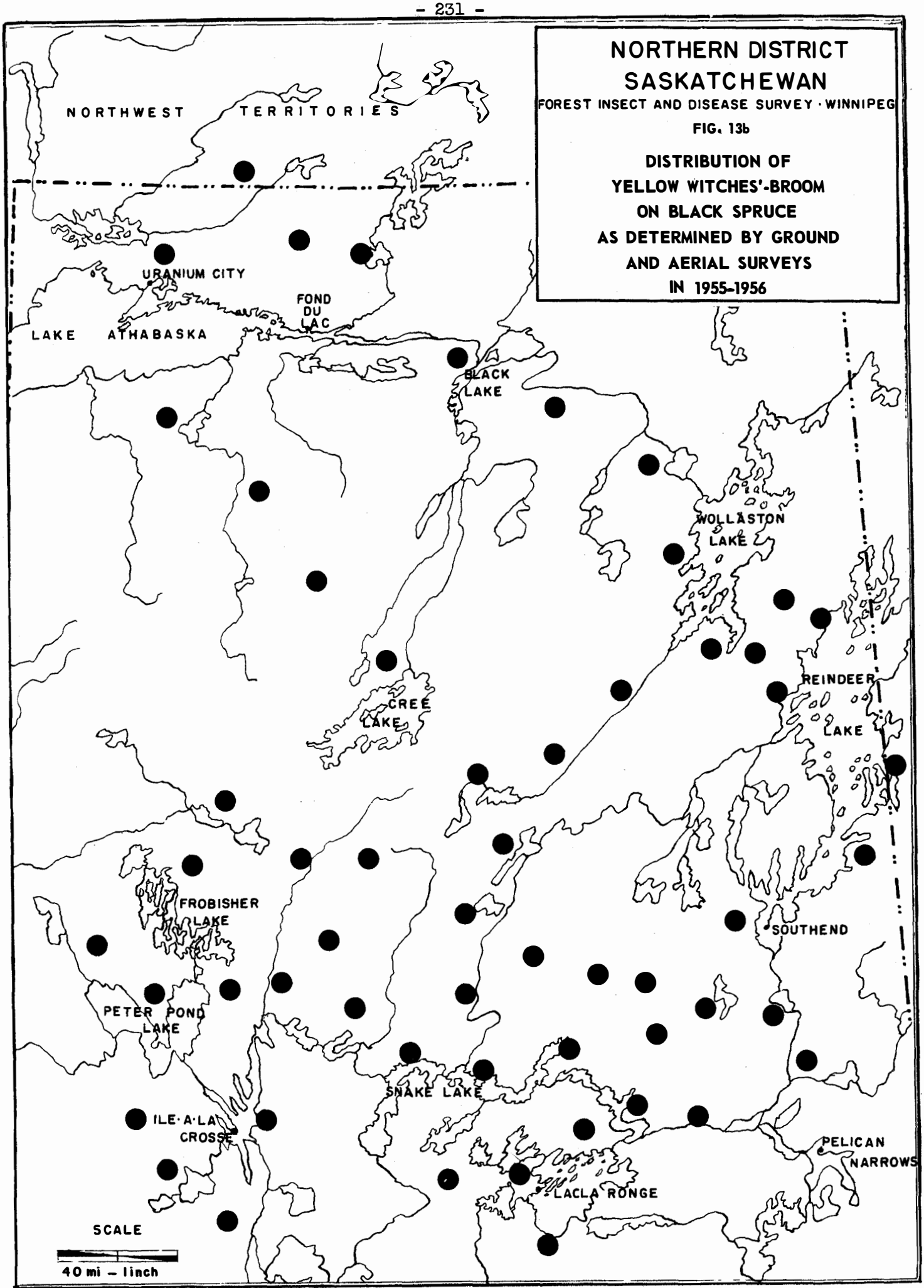


PRINCE ALBERT DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY-WINNIPEG

FIG. 13a

DISTRIBUTION OF YELLOW WITCHES'-BROOM ON BLACK SPRUCE AS DETERMINED BY GROUND AND AERIAL SURVEYS IN 1955-1956


NORTHERN DISTRICT
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY · WINNIPEG
FIG. 13b
DISTRIBUTION OF
YELLOW WITCHES'-BROOM
ON BLACK SPRUCE
AS DETERMINED BY GROUND
AND AERIAL SURVEYS
IN 1955-1956
NORTHWEST TERRITORIES
URANIUM CITY
FOND DU LAC
LAKE ATHABASKA
BLACK LAKE
WOLLASTON LAKE
REINDEER LAKE
CREE LAKE
FROBISHER LAKE
SOUTHEND
PETER POND LAKE
SNAKE LAKE
ILE-A-LA CROSSE
PELICAN NARROWS
LACLA RONGE
SCALE
40 mi – 1inch

9.4.3 Linospora Leaf Blight, Linospora tetraspora

Linospora leaf blight was again found on balsam poplar foliage in the southern portion of the district. The foliage of balsam poplar reproduction was heavily discoloured at Potatoe Lake, Lac La Ronge, Prince Albert National Park and around Weyakwin Lake.

9.4.4 Balsam Fir Needle Cast.

Light damage by balsam fir needle cast was found on nearly all understory balsam in the Prince Albert National Park and Lac La Ronge area.

9.4.5 Mistletoe on Jack Pine, Arceuthobium americanum.

The boundaries of mistletoe infection remained the same as in 1955. Reports were received from the Saskatchewan Department of Natural Resources of the occurrence of jack pine mistletoe on islands at the south end of Reindeer Lake but to date no specimens have been received to confirm these reports.

9.4.6 A Parasite of the Jack-Pine Mistletoe, Wallrothiella arceuthobii.

Several collections of mistletoe plants were made on which the parasite Wallrothiella arceuthobii was attacking the female plants. The majority of these collections were made on rocky islands north of Lac La Ronge and at the North end of Churchill Lake.

9.4.7 Other Noteworthy Tree Diseases.

The following table lists other noteworthy tree diseases which occurred throughout Prince Albert National Park and the Northern District of Saskatchewan in 1956.

Table 7.
Other Noteworthy Diseases

Disease	Location	Remarks
Black knot on pincherry	Narrows Road, P.A.N.P. Lac La Ronge	Some mortality
Needle rust on jack pine	Waskesiu	Light infection
Spindle rust on Jack pine, Cronartium comptoniae	Pine Creek	Numerous galls observed
Needle rust on balsam fir	Waskesiu Lac La Ronge	Infection light
Globose gall rust on jack pine	Pine Creek Lavallee L.,PANP?	Numerous galls observed
Needle cast on jack pine	Co-Op Point, Reindeer Lake	Infection light
Cone rust on black spruce	Foster Lakes	Small number of cones affected
Armillaria root rot on jack pine	Lavallee L.,PANP	Light infection in regeneration pine

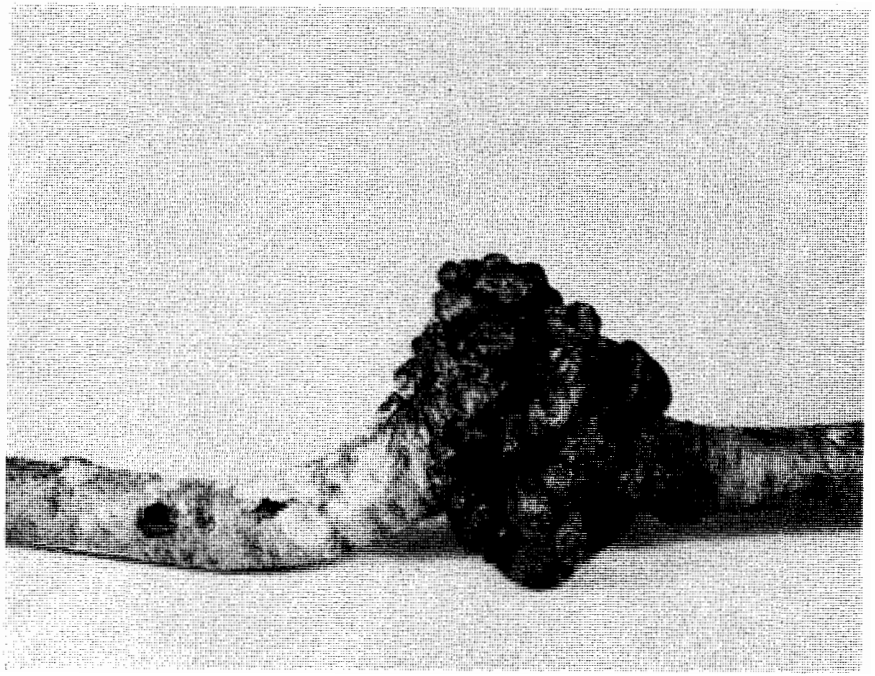


Fig.15

Growth on Main Stem of Alder.
Rabbit Creek, Sask.
Photograph by B. McLeod.
Negative Number W-82

Fig.14

Peridermium coloradense Broom on Black Spruce. Sask. - N.W.T. Boundry.
Photograph by B. McLeod.
Negative Number W-83

9.5 SPECIAL PROJECTS

9.5.1 Phenological Studies.

Three plots were established to record growth measurements of several tree species. Plots were established in Prince Albert National Park and at Skunk Creek and Lac La Ronge. Tree species selected for measurement were white spruce, trembling aspen, jack pine, tamarack and white birch. Five trees of each species in the plot were tagged. One lateral from each tree was marked and two measurements were taken during the season; one in June and one in early September. The object of this study was to measure phenological events in terms of plus or minus days from a reference point such as Winnipeg or Red Rock Lake and to prepare a phenological map of the area.

The following table lists the locations of the phenological plots in Prince Albert National Park and Northern District of Saskatchewan in 1956.

Table 8.

Place	Grid	Sec.	Tp.	Rge.	Mer.
Prince Albert National Park	8-074-317	28	53	1	W3rd
Skunk Creek	8-079-331	13	62	24	W2nd
Lac La Ronge	8-080-342	5	70	22	W2nd

9.5.2 Special Collections.

The following table contains a list of the special collections made in 1956 in Northern Saskatchewan. The collections were submitted to personnel working on special projects.

Table 9.

Type and Purpose of Collections	No. of Collections	Time spent making collections
Aphid collections for G. Bradley, Winnipeg, Man.	52	Collected during regular field season
Tamarack and black spruce disc collections for L. Nairn, Winnipeg Lab.	2	3 days
Neodiprion sawfly larvae	43	Collected during regular field season

9.6 SUMMARY OF INSECT AND TREE DISEASE COLLECTIONS

Table 10 lists by tree species the number of insect and tree disease samples collected in the Prince Albert National Park and Northern District of Saskatchewan. A total of 403 insect samples and 35 tree disease samples were submitted for identification.

Table 10.
Summary of Insect and Tree Disease Collections
Northern District of Saskatchewan - 1956

Tree Species	No. of Insect Samples	No. of Disease Samples
White spruce	72	2
Black spruce	125	14
Aspen	32	4
Balsam poplar	9	2
Jack pine	64	12
Larch	34	
Willow	33	
W. birch	11	
Balsam	10	
Alder	7	
Hazel	1	
Cherry		1
Miscellaneous	5	
TOTALS	403	35

9.7 PERSONNEL CONTACTED

The following table lists the names of the personnel from the Saskatchewan Department of Natural Resources, Prince Albert National Park and other co-operators contacted during the 1956 field season.

Table 11.

Name	Position	Address	No. of Contacts
F. Hewitt	Acting Dir. of Forests	Prince Albert	1
C. Brown	Northern Administrator	Prince Albert	4
A. Davidson	Ass't to Dept. Minister	Prince Albert	2
H. Dempster	Park Superintendent	Prince Albert	4
B. A. Matheson	District Superintendent	Prince Albert	1
A. Hansen	"	Meadow Lake	1
E. Dodds	District Supervisor	Prince Albert	5
J. Johnson	"	Prince Albert	3
N. Nicholson	DNR Training School	Prince Albert	1
J. Clay	Game Branch	Prince Albert	1 *
P. Bergman	Game Branch	Lac La Ronge	
A. Kabzens	Forester	Prince Albert	2

Table 11 continued

Name	Position	Address	No. of Contacts
W. Bailey	Forester	Prince Albert	1
M. Laird	"	Prince Albert	1
C. Kirby	"	Prince Albert	1
D. McKinnon	"	Lac La Ronge	*
D. Kelly	Sask. Smoke Jumpers	Lac La Ronge	*
C. Davies	Chief Park Warden	Waskesiu	2
Warden Harrison	Dist. Park Warden	Waskesiu	3
J. Cloutier	Field Officer	Lac La Ronge	*
T. Woods	"	Lac La Ronge	*
C. Ferguson	"	Lac La Ronge	*
L. Clements	"	Ile a la Crosse	1
R. Taylor	"	Buffalo Narrows	2
S. Seivewright	"	Meadow Lake	1
F. Arnold	"	Prince Albert	*
L. Horne	"	Holbein	2
B. Crothers	"	Glaslyn	1
R. Wilson	"	Prince Albert	3
J. Hall	Radio Branch	Prince Albert	*
J. Barton	Radio Branch	Prince Albert	*
F. Hawkins	Field Officer	Stony Rapids	1
A. Towell	Dist. Supervisor	Prince Albert	2
T. Kraigh	Forester	Prince Albert	1
D. Neilson	Agric. Rep.	Prince Albert	1
J. Jameson	Dom. For. Service	Winnipeg	1

* more than 10 contacts during season.

10. ANNUAL REPORT OF THE FOREST BIOLOGY RANGER WEST-CENTRAL DISTRICT OF SASKATCHEWAN

1956

by

A. Machuk

INTERIM REPORT - 1956

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

February, 1957

10.1 INTRODUCTION

Forest insect and tree disease surveys were carried out in the West-Central District of Saskatchewan from the latter part of May to the end of July 1956. Four hundred and nineteen insect and twenty-nine tree disease samples were submitted to the Winnipeg and Saskatoon laboratories.

Several mass collections of larch sawfly larvae and cocoons were made for personnel working on larch sawfly projects at the Winnipeg and Belleville laboratories. In addition, 24 special collections of aphids were obtained for Mr. G. Bradley of the Forest Biology Laboratory, Winnipeg.

A special survey to determine population densities of the boxelder twig borer, Proteoteras willingana was conducted in five widely separated Manitoba maple shelterbelts for Mr. R. M. Prentice, Winnipeg, Manitoba.

Seven white spruce, eleven Manitoba maple and nine trembling aspen permanent sampling stations were established in shelterbelts and native stands throughout the district. As far as was practicable, each station was so located as to meet the least possible interference.

The balance of the field season, extending from August 1 to September 15, was spent assisting Forest Biology rangers in the Prince Albert, Northern and Meadow Lake districts of Saskatchewan and the Southern District of Manitoba. Work carried out during this latter period is covered in the annual reports submitted by the rangers in the respective districts.

Approximately 6 hours of aircraft travel were supplied during this period by the Department of Natural Resources, which made it possible to survey areas in the Prince Albert and Northern districts otherwsie inaccessible. The assistance and co-operation received from the Saskatchewan Department of Natural Resources and Dominion Government Experimental and Forestry farms is gratefully acknowledged.

10.2 REVIEW OF FOREST INSECTS AND TREE DISEASES

The main insect pests were the large aspen tortrix, the yellow-headed spruce sawfly and the gray willow-leaf beetle.

The large aspen tortrix occurred commonly throughout the district but for the most part caused only light defoliation.

The yellow-headed spruce sawfly was found occasionally in the south-western portion of the district and quite commonly on the north and east side. Generally, defoliation ranged from trace to light with the exception of two localized infestations which caused moderate to heavy damage to shade and ornamental plantings in the Wilkie and Pilger districts.

Gray willow-leaf beetles were numerous in the western and northern portions of the district and caused considerable skeletonizing of willow foliage while throughout the remainder of the district populations were recorded as light.

The boxelder twig borer occurred commonly in most Manitoba maple shelterbelts examined. The heaviest populations were concentrated in the southern regions. Damage to twigs was light with the exception of one shelterbelt in the Lanigan area that was moderately attacked.

Hypoxylon pruinatum, a canker of poplar, was general but appeared most common in the more concentrated aspen stands in the northern regions of the West-Central District.

A spruce needle cast was observed in several widely separated shelterbelts but was causing no appreciable damage.

Black knot on cherry was noted in several areas of the district but did not appear to be very common since in each instance only one specimen of the disease was recovered.

10.3 INSECT CONDITIONS

10.3.1 Large Aspen Tortrix, Choristoneura conflictana (Wlk.).

The large aspen tortrix was quite common in the eastern and northern regions of the district and to a lesser extent in native stands on the south and west side.

The heaviest populations were recorded in the area east of highway #20 south through the Quill Lakes region to the Day Star Indian Reserve. Within this region defoliation ranged from light in the vicinity of Watson to moderate with occasional "pockets" of heavy in the Touchwood Hills.

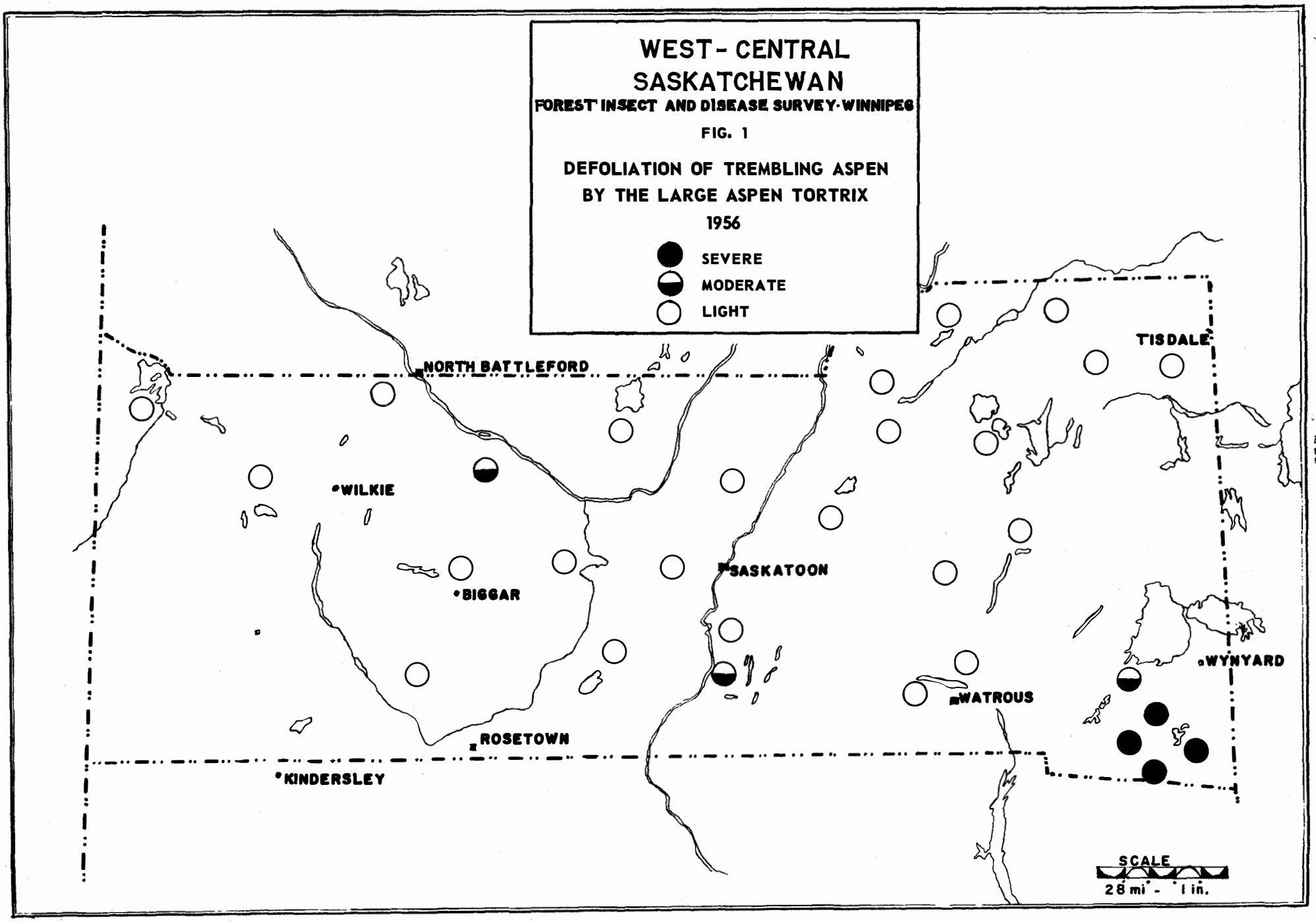
An area of approximately 20 acres was moderately attacked near Ranger Lake in the Keppel Provincial Forest and in the Dundurn Provincial Forest several isolated patches of moderate to heavy defoliation were recorded. In the above-mentioned areas it was noted that trembling aspen reproduction was most heavily defoliated while the older trees were relatively free from attack. Throughout the remainder of the district defoliation ranged from a trace to light. Very light scattered parasitism was observed at numerous points throughout the district.

The distribution and relative abundance of this insect in West-Central Saskatchewan as determined by ground surveys is shown in Figure 1.

The frequency of occurrence of the large aspen tortrix in trembling aspen samples is shown in Table 1.

Table 1.
Summary of Occurrence of the Large Aspen Tortrix
West-Central District of Saskatchewan - 1956

Host	No. of Collections	Percentage Containing L. A. T.
Trembling aspen	65	35


WEST - CENTRAL
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY · WINNIPEG
FIG. 1
DEFOLIATION OF TREMBLING ASPEN
BY THE LARGE ASPEN TORTRIX
1956
SEVERE
MODERATE
LIGHT
NORTH BATTLEFORD
TISDALE
WILKIE
BIGGAR
SASKATOON
WYNYARD
WATROUS
ROSETOWN
KINDERSLEY
SCALE
28 mi - 1 in.

10.3.2 Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.).

The yellow-headed spruce sawfly was the most common insect pest attacking spruce shelterbelts and ornamental plantings in the West-Central District in 1956. Defoliation was recorded as light to moderate in the eastern and northern sections with the exception of two locations; namely at the Wilkie cemetery where shade trees were severely defoliated, and a stand at Pilger, where young white spruce, two to four feet tall in a recently planted shelterbelt were stripped of current foliage.

Elsewhere in the district, light defoliation was recorded in shelterbelts in the Hagen, Spalding, Grandora, Rosthern and Nokomis regions.

Populations in the southwestern section of the district were low with only the occasional larva taken from the many shelterbelts examined, and no noticeable defoliation was observed.

The distribution and relative abundance of the yellow-headed spruce sawfly as determined by ground surveys is shown in Figure 2.

The frequency of occurrence of this insect in white spruce samples taken in 1956 is shown in Table 2.

Table 2.
Summary of Occurrence of the Yellow-headed Spruce Sawfly
West-Central District of Saskatchewan - 1956

Host	No. of Collections	Percentage containing Yellow-headed spruce sawfly
White spruce	42	33

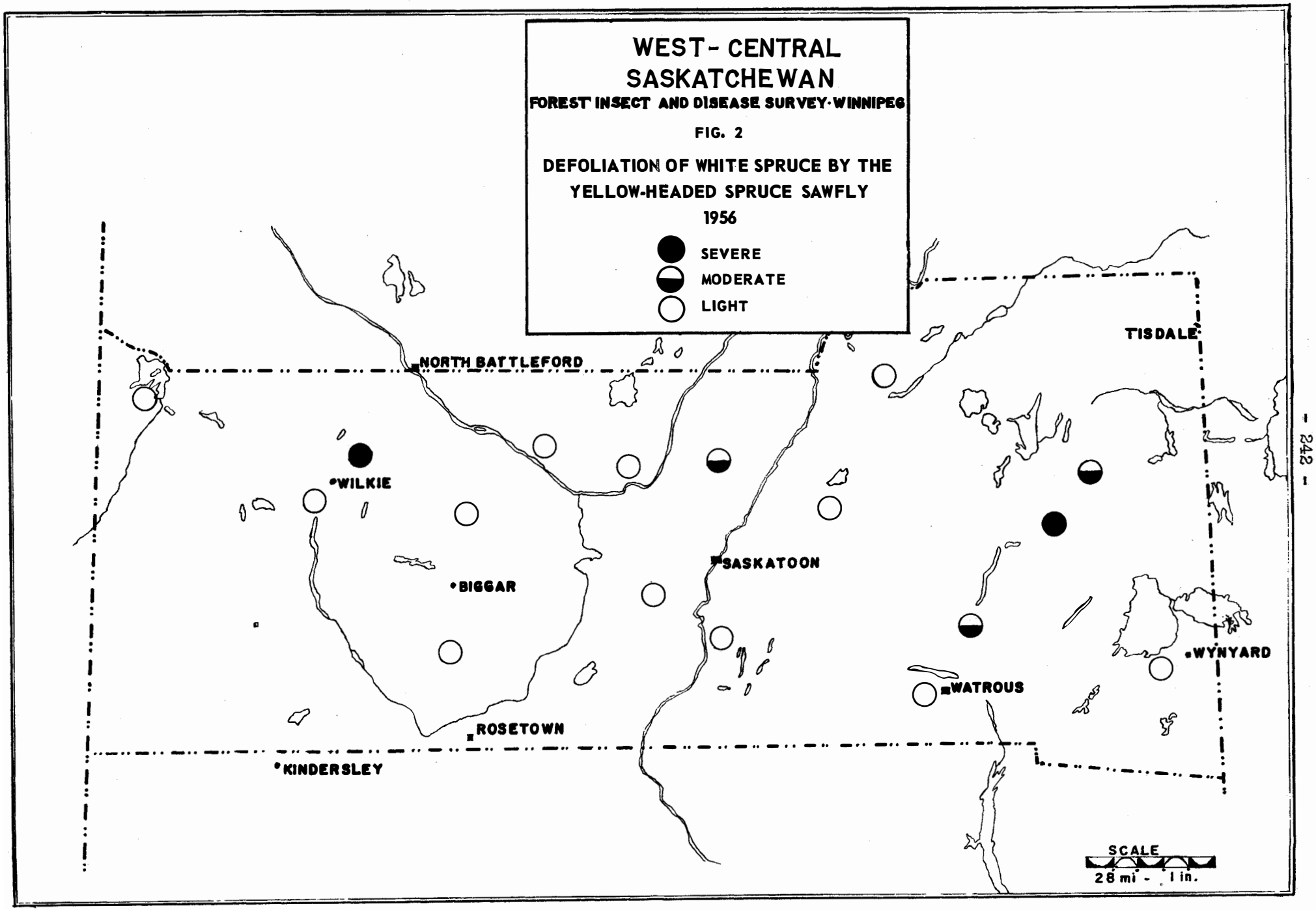
10.3.3 Gray Willow-leaf Beetle, Galerucella decora (Say).

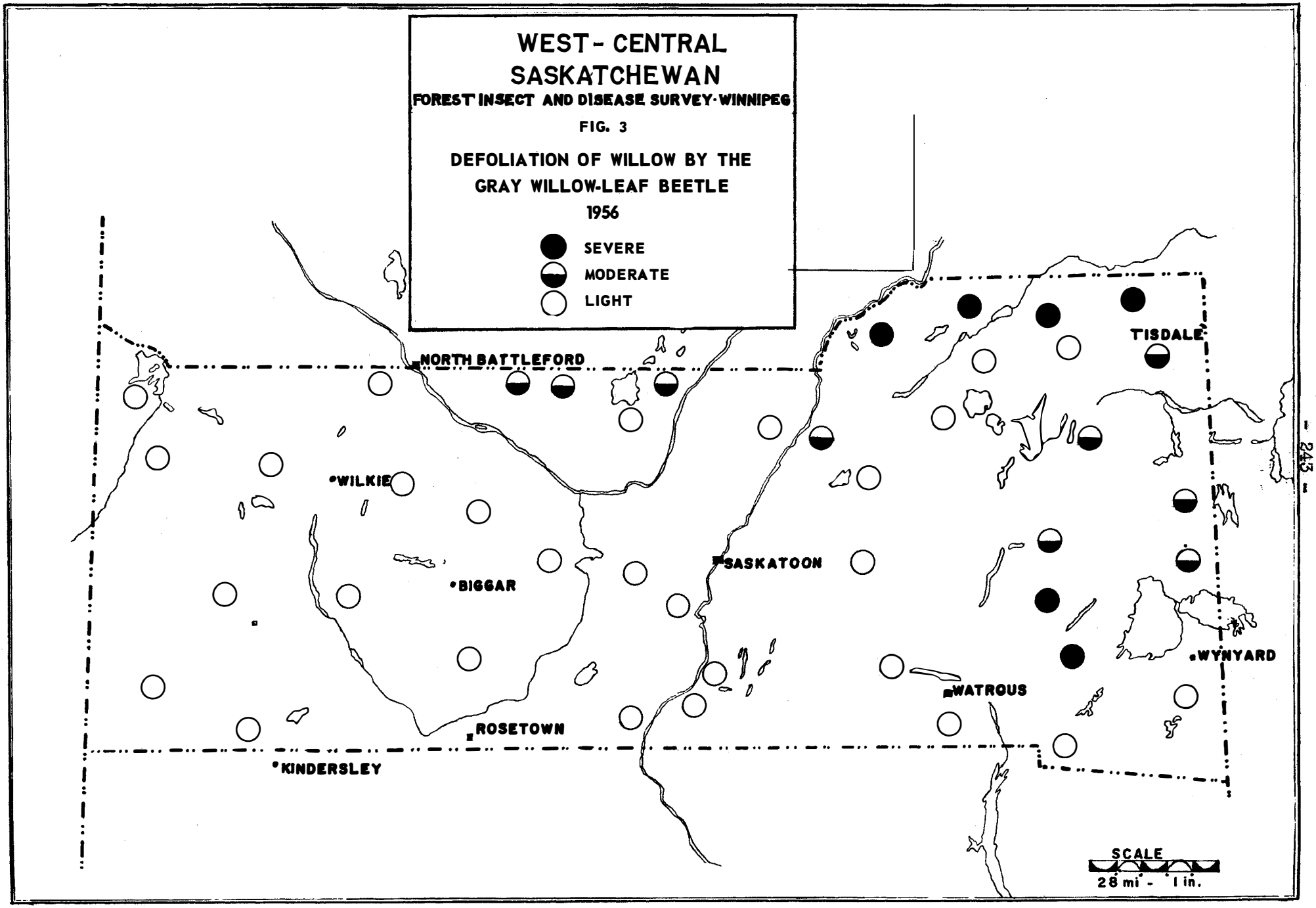
This insect was encountered in most areas surveyed this season. The heaviest infestations occurred in the area encompassed by Lac Vert and Ponass Lake in the north and Dafoe and Wynyard in the south. Severe skeletonizing of willow foliage was recorded in the Watson - Dafoe region. Other areas of moderate to heavy skeletonization occurred in the Ponass Lake region west to Lac Vert and north to Melfort. Elsewhere "pockets" of light to moderate damage were observed in the Batache and Redberry Lake areas while throughout the remainder of the district populations were recorded as light.

The distribution and relative abundance of the gray willow-leaf beetle as determined by ground surveys is shown in Figure 3.

10.3.4 Boxelder Twig Borer, Proteoteras willingana (Kearf.).

The distribution of this insect was general throughout most Manitoba maple shelterbelts examined. Populations were low, with the exception of one shelterbelt 6 miles east of Lanigan where it was causing light to moderate twig mortality. Shelterbelts showing light damage by this species were observed in the Tessier, Dundurn and Rosthern regions. In the remainder of the district,


WEST- CENTRAL
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY-WINNIPEG
FIG. 2
DEFOLIATION OF WHITE SPRUCE BY THE
YELLOW-HEADED SPRUCE SAWFLY
1956
SEVERE
MODERATE
LIGHT
NORTH BATTLEFORD
TISDALE
WILKIE
BIGGAR
SASKATOON
WYNYARD
WATROUS
ROSETOWN
KINDERSLEY
SCALE
28 mi - 1 in.


WEST - CENTRAL
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY - WINNIPEG
FIG. 3
DEFOLIATION OF WILLOW BY THE
GRAY WILLOW-LEAF BEETLE
1956
SEVERE
MODERATE
LIGHT
NORTH BATTLEFORD
TISDALE
WILKIE
BIGGAR
SASKATOON
WYNYARD
WATROUS
ROSETOWN
KINDERSLEY
SCALE
28 mi - 1 in.

populations were recorded as light.

A special survey was made to evaluate populations of the boxelder twig borer through a sampling technique devised by Mr. R. M. Prentice of the Winnipeg Laboratory. Five representative areas were selected in the district and at each area 4 branches 36" long were removed from the cardinal points on the lower crown of each of five trees. The twigs were counted and examined for the presence of twig borers. The relative abundance of the boxelder twig borer at each of the five sampling points as determined by this survey is shown in Table 3.

10.3.5 Black-headed Budworm, Acleris variana (Fern.).

This species occurred occasionally in shelterbelts at scattered points throughout the district but populations were low and defoliation was negligible.

Buds were opening at the end of May and the first black-headed budworm larvae, probably second instar, were taken from a white spruce shelterbelt at Rosthern on June 9. The heavier populations were observed on open growing and ornamental trees. Light defoliation was recorded on open growing spruce in the Manito Provincial Forest, Dundurn Provincial Forest and on ornamentals in the Manitou Provincial Park at Watrous.

10.3.6 Spruce Budworm, Choristoneura fumiferana Clem.

This insect occurred in white spruce shelterbelts at three widely separated points, namely; Lanigan, Rosthern and Hagen. Populations at Lanigan and Hagen were low while at Rosthern spruce budworm in association with the yellow-headed spruce sawfly caused moderate defoliation to a shelterbelt approximately one and one-half miles west of the town.

10.3.7 Fall Cankerworm, Alsophila pometaria (Harr.).

Distribution of the fall cankerworm was confined to the southwestern portion of the district where deciduous shelterbelts near Kindersley and Rosetown were lightly defoliated. Eight samples were taken from deciduous shelterbelts with an average of 3 larvae per 5 tree samples. Throughout the remainder of the district shelterbelts appeared to be free from attack.

10.3.8 Boxelder Leaf Roller, Gracillaria prob. negundella (Cham.).

This insect was quite common in most shelterbelts examined and in many cases caused considerable damage to the leaves of individual trees in the stand. In many instances the leaves of the lower crown of the tree were mined and skeletonized to the extent that they were easily blown off by the wind.

Moderate to heavy infestations were recorded at Conquest, Rosthern and Stranraer. In the remainder of the district infestations were negligible.

10.3.9 A Leaf Roller on Manitoba maple, Archips negundana (Dyar.).

This insect was found closely associated with the boxelder leaf roller but populations were low and caused no appreciable leaf rolling.

Table 3.

Results of Twig Sampling of Manitoba Maple for Boxelder Twig Borer Populations
West-Central District of Saskatchewan
1956

Plot No.*	Tree No.	Infestation Data								Average per cent twigs infested	
		Branch #1		Branch #2		Branch #3		Branch #4			
		No. of twigs	No. of twigs infested	No. of twigs	No. of twigs infested	No. of twigs	No. of twigs infested	No. of twigs	No. of twigs infested	Per tree	Per plot
1	1	15	0	11	0	9	0	12	2	4.25	
	2	18	0	10	0	10	0	11	1	2.04	
	3	13	1	24	0	29	1	20	0	2.32	
	4	16	0	21	0	14	0	15	0	0.00	
	5	17	0	24	1	13	0	27	1	2.47	2.22
2	1	17	3	9	2	7	2	11	3	22.73	
	2	16	3	12	2	11	3	13	4	23.08	
	3	11	2	12	3	8	2	7	1	21.05	
	4	11	2	13	6	9	2	10	2	27.91	
	5	11	1	13	2	7	0	8	1	10.26	21.01
3	1	14	1	7	1	10	1	9	4	17.50	
	2	11	2	6	0	11	2	7	0	11.43	
	3	9	1	4	0	9	2	10	0	31.25	
	4	11	1	13	1	9	0	14	1	6.38	
	5	12	2	14	3	11	3	7	1	20.45	17.40

* Plot #1 - Domremy, Sask. Sec. 11-44-26-W2
Plot #2 - Lanigan, Sask. Sec. 22-33-21-W2
Plot #3 - Tessier, Sask. Sec. 7-38-10-W3.

Table 3 continued

Plot No.*	Tree No.	Infestation Data								Average per cent twigs infested	
		Branch #1		Branch #2		Branch #3		Branch #4			
		No. of twigs	No. of twigs infested	No. of twigs	No. of twigs infested	No. of twigs	No. of twigs infested	No. of twigs	No. of twigs infested	Per tree	Per plot
4	1	17	2	9	0	23	3	22	2	9.86	
	2	10	1	13	3	24	2	19	0	9.09	
	3	18	1	16	0	13	0	24	2	4.22	
	4	11	1	19	0	32	0	22	1	2.38	
	5	15	1	24	0	22	3	14	0	5.33	6.18
5	1	11	1	19	0	14	3	12	0	7.14	
	2	13	4	17	2	18	2	12	0	13.33	
	3	11	2	18	3	8	1	9	2	17.39	
	4	10	1	7	2	9	1	8	3	20.59	
	5	10	0	8	0	9	1	8	0	2.86	12.26

*Plot #4 - Adanac, Sask. Sec.14-40-22-W3
-Plot#5 - Dundurn, Sask. Sec. 24-31-5-W3

10.3.10 Spruce Spider Mite, Paratetranychus ununguis (Jac.).

Six scattered collections of the spruce spider mite were made throughout the district in 1956. Damage was generally confined to open growing and ornamental white spruce. A planting near Birch Hills showed moderate browning of foliage. At all other sampling points, only trace to light damage was recorded.

10.3.11 Green-headed Spruce Sawfly, Pikonema dimmockii (Cress.).

The green-headed spruce sawfly was found occasionally associated with the yellow-headed spruce sawfly. Only four collections were made throughout the district this year and in each case defoliation caused by this insect was negligible.

10.3.12 Boxelder Gall Fly, Cecidomyia negundinis Gill.

This insect occurred commonly on the west side and sporadically in the eastern portion of the district. The first galls were observed on Manitoba maple 14 miles southwest of North Battleford on June 4. Damage was confined to a few leaves on each tree with the exception of several shelterbelts in the Biggar-Kerrobert area, where approximately 10 per cent of the leaves of the lower crown of some trees were galled.

10.3.13 Pitch Nodule Maker, Petrova albicapitana (Busck.).

Two nodules of this insect were found in a small plantation of jack pine in the Dundurn Provincial Forest. Damage was confined to two trees about 10 feet tall. Another sample was obtained from a jack pine plantation consisting of approximately 30 acres in the Manito Provincial Forest. No old damage was noted on 25 trees examined.

10.3.14 Larch Sawfly, Pristiphora erichsonii (Htg.).

Since tamarack is not common in the West-Central District of Saskatchewan, the larch sawfly is not a serious pest. Larch sawfly larvae were found in three areas, namely; the Dominion Forestry Farm at Sutherland, a farm planting 21 miles northeast of Biggar and from several ornamentals on the Dominion Experimental Farm at Scott. In each case little or no defoliation was recorded.

10.3.15 Spruce Needle Worm, Dioryctria renicullela (Grt.).

Only four collections of this insect consisting of 2 larvae and 2 pupae were made on white spruce at widely scattered points in the district.

10.3.16 Aspen Blotch Miner, Lithocolletis salicifoliella Chamb.

This insect was at low population levels and recorded at only three widely separated areas in the district. Light damage to trembling aspen foliage was recorded at Ponass Lake, Melfort and in the Dundurn Provincial Forest where a small stand of trembling aspen reproduction was moderately attacked.

10.3.17 Ugly Nest Tortrix, Archips cerasivorana (Fitch.).

Nests of this insect were not numerous in 1956 and defoliation of chokecherry was generally light. One "pocket" of moderate defoliation covering 1/4 acre of chokecherry was recorded in the Dundurn Provincial Forest. Scattered nests were also observed two miles north of Balloon Lake in the Manito Provincial Forest.

10.3.18 American Poplar Leaf Beetle, Gonioctena americana (Schaeff.).

This insect was not common in the West-Central district in 1956. One collection was made near Ranger Lake in the Keppel Provincial Forest, where it caused light defoliation to trembling aspen reproduction over a small area.

10.3.19 Balsam-fir Sawfly, Neodiprion abietis (Harr.).

Only one collection of the balsam-fir sawfly was obtained from shelterbelts in the district. The collection was taken from a white spruce shelterbelt 1.5 miles west of Rosthern and consisted of one larva and one cocoon.

10.3.20 The Owlet Moth, Orthosia hibisci (Gn.).

This insect was almost always present in deciduous shelterbelts but caused no defoliation.

10.3.21 A Webworm, Tetralopha asperatella (Clem.).

This webworm appeared occasionally throughout mature aspen stands in the district but caused negligible damage.

10.3.22 Poplar Leaf Roller, Sciaphila duplex Wlshm.

Light populations of this poplar leaf roller were found closely associated with the large aspen tortrix. Defoliation caused by this insect was negligible in most aspen stands examined with the exception of a small infestation on sub-marginal land 1/2 mile north of Bay Trail where approximately 3 acres of trembling aspen regeneration was moderately attacked. Elsewhere in the district, light leaf rolling was recorded in the Day Star Indian Reserve, scattered patches in the Dundurn Provincial Forest, and in a small stand of aspen regeneration near Muskiki Lake.

10.3.23 Other Noteworthy Insects.

Other insect species which occurred commonly throughout the district, but causing no appreciable defoliation, are listed below.

Table 4.

Other Noteworthy Insects - 1956

Insect Species	No.of Samples	Remarks
Nematus sp.	16	Sawfly common on willow and aspen
Itame loricaria	20	Common on deciduous hosts
Pandemis canadana	11	Common on most deciduous hosts
Epinotia nisella criddleana	11	Common on poplar
Gelechiid sp.	9	Occurred occasionally on deciduous hosts
Chrysomelid sp.	6	Occurred occasionally on poplar, willow
Archips rosaceana	5	Occurred occasionally on aspen
Amauronematus sp.	5	Sawfly common on willow and aspen
Badebecia urticana	3	Appeared occasionally on poplar
Halisidota maculata	3	Occurred occasionally on maple
Sicya macularia	3	Occurred occasionally on ash

10.4 TREE DISEASE CONDITIONS

10.4.1 Canker of Poplar, Hypoxylon pruinatum.

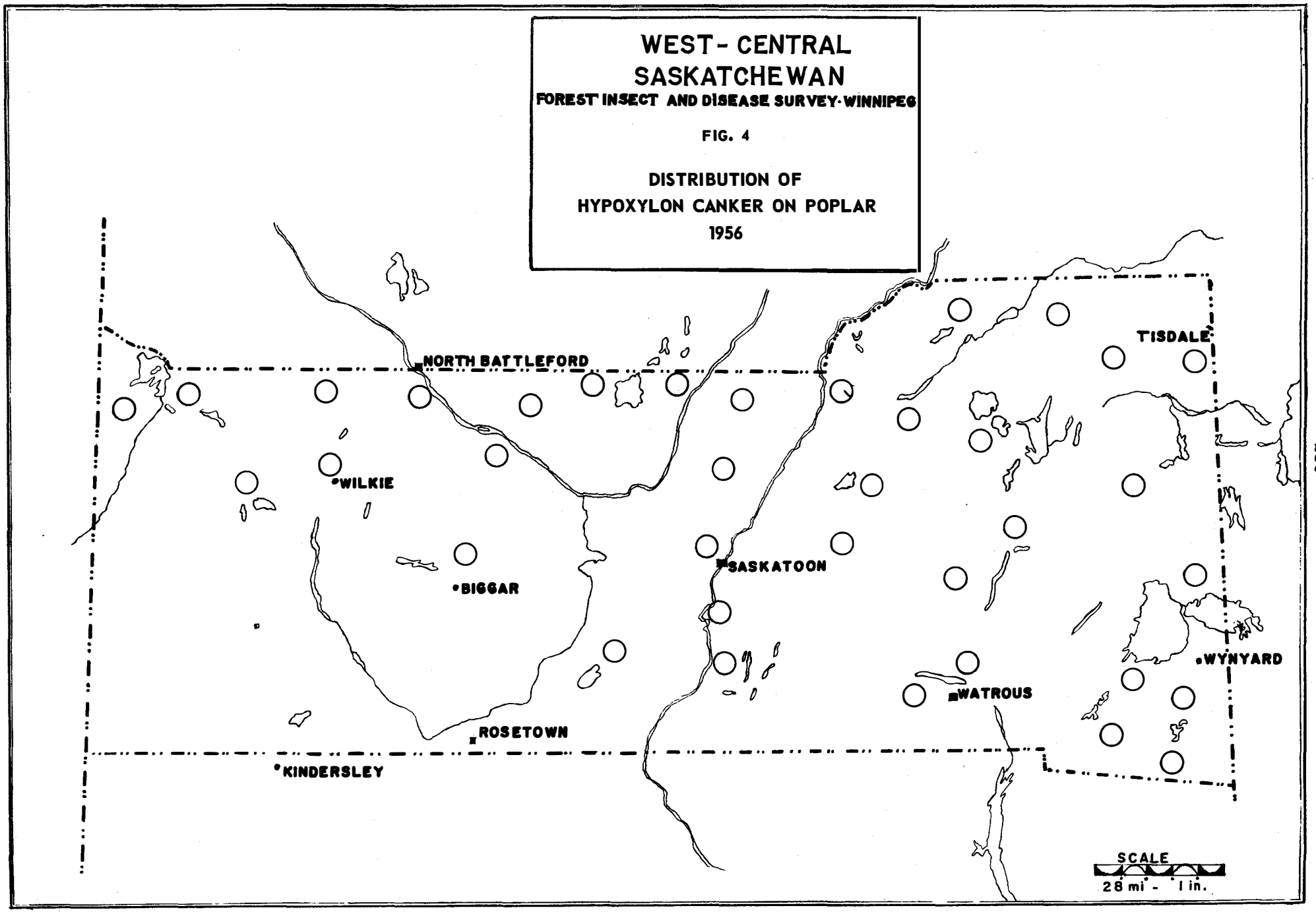
Cankers caused by H. pruinatum occurred commonly throughout native trembling aspen stands in the West-Central District. Infections, however, were light and only a small percentage of the trees in infected stands were infected. Some branch and top mortality was recorded in the northern and eastern regions of the district where the more concentrated stands of trembling aspen occur. H. pruinatum was also observed on balsam poplar but to a much lesser extent.

The distribution and intensity of Hypoxylon canker throughout the district as determined by ground surveys is shown in Figure 4.

10.4.2 Spruce Needle Cast.

This disease was noted in several widely separated shelterbelts but was causing no appreciable damage.

The heaviest infection recorded was in a farm shelterbelt at Melfort where, in a planting of 750 white spruce, the foliage on the lower crowns of approximately 65 trees was infected.


WEST - CENTRAL
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY - WINNIPEG
FIG. 4
DISTRIBUTION OF
HYPOXYLON CANKER ON POPLAR
1956
NORTH BATTLEFORD
TISDALE
WILKIE
BIGGAR
SASKATOON
WYNYARD
WATROUS
ROSETOWN
KINDERSLEY
SCALE
28 mi - 1 in.

10.4.3 A Needle Blight, Phonia sp.

This blight, which causes partial discoloration to needles on conifers, was recorded in a Scots pine shelterbelt south of Conquest. The affected trees had a reddish appearance similar to "winter drying". The disease appeared on both current and old foliage but did not appear to be causing any serious damage.

10.4.4 A Slash Decay, Phlebia strigose zonata.

This fungus, which occurs on slash in cut over trembling aspen stands, was observed at several widely scattered points throughout the district.

10.5 SPECIAL PROJECTS

10.5.1 Special Collections.

Several special collections were made during the season for project workers at the Winnipeg and other laboratories. The type of collection and for whom collected is shown in the following table.

Table 5.
Summary of Special Collections
West-Central District of Saskatchewan - 1956

Type of collection and for whom collected	No. of Collections	Time spent collecting (including travel)
Larch sawfly larval collection for J. Muldrew, Winnipeg Lab.	2	5 days
Larch sawfly cocoon collection for Dr. Coppel, Belleville	1	2 days
Aphid collections for G. A. Bradley, Winnipeg Lab.	24	4 days

10.5.2 Permanent Sample Stations.

Twenty-seven permanent sample stations were established in 1956. Stations were visited during the field season to obtain data on general insect distribution and population trends. The locations of the stations are shown in Table 6.

Table 6.
Permanent Sample Stations
West-Central District of Saskatchewan
Established 1956

No.	Tree species	Place	Location			
			Sec.	Tp.	Rge.	Mer.
A.1	White spruce	Rosthern	34	42	3	W3
A.3	" "	Radisson	29	40	10	W3
A.6	" "	Scott	17	39	22	W3
A.8	" "	Melfort	8	45	18	W2
A.11	" "	Humboldt	8	37	22	W2
A.12	" "	Lanigan	22	33	21	W2
B.3	" "	Sutherland	12	37	5	W3
A.1	Manitoba maple	Rosthern	34	42	3	W3
A.3	" "	Radisson	29	40	10	W3
A.4	" "	Wilkie	36	41	19	W3
A.6	" "	Scott	17	39	22	W3
A.8	" "	Melfort	8	45	18	W2
A.11	" "	Humboldt	8	37	22	W2
A.12	" "	Lanigan	22	31	21	W2
A.13	" "	Tessier	7	33	10	W3
A.14	" "	Millerdale	5	33	21	W3
A.15	" "	Dundurn	11	32	5	W3
B.3	" "	Sutherland	12	37	5	W3
A.1	Trembling aspen	Rosthern	35	42	3	W3
A.2	" "	Langham	19	39	8	W3
A.5	" "	Manito Prov. Forest	28	42	27	W3
A.7	" "	Keppel Prov. Forest	11	40	13	W3
A.9	" "	Crystal Springs	2	43	24	W2
A.10	" "	Middle Lake	32	40	23	W2
A.12	" "	Lanigan	22	31	21	W2
B.2	" "	Dundurn Prov. Forest	24	32	5	W3
B.4	" "	Domremy	15	43	27	W2

10.6 SUMMARY OF INSECT AND TREE DISEASE COLLECTIONS

A summary of insect and tree disease collections from host trees in the West-Central District of Saskatchewan in 1956 is shown in Table 7.

Table 7.
Summary of Insect and Tree Disease Samples
West-Central District of Saskatchewan - 1956

Host Tree	Insect Samples	Tree Disease Samples
Trembling aspen	65	9
White spruce	42	1
Manitoba maple	32	-
Willow	20	-
Chokecherry	12	2
Green ash	11	-
Jack pine	9	-
Balsam poplar	9	-
Miscellaneous	7	1
Elm	6	-
Tamarack	6	-
Scots pine	3	2
Caragana	3	-
White birch	3	-
Black spruce	1	-
Colorado spruce	1	-
Plum	1	-
Dogwood	1	-
Pincherry	1	-
Wild rose	--	1
TOTALS	233	16

10.7 PERSONNEL CONTACTED

Table 7 shows contacts made with personnel of the Saskatchewan Department of Natural Resources and Dominion Government Experimental farms.

Table 8.
Personnel Contacted

Name	Position	Address
J. Johnson	District Supervisor, DNR	Prince Albert
A. Kabzems	Forester, DNR	" "
F. Arnold	Field Officer, DNR	" "
R. Wilson	Pilot, DNR	" "
L. Horne	Field Officer, DNR	Holbein
J. Cloutier	Field Officer, DNR	Lac la Ronge
T. Woods	Field Officer, DNR	Lac la Ronge

Table 8 continued

Name	Position	Address
J. Langford	Patrolman, DNR	Prince Albert
W. L. Kerr	Superintendent, Forestry Farm	Sutherland
L. Andrews	Foreman, Forestry Farm	Sutherland
G. D. Mathews	Superintendent, Exp. Farm	Scott
D. H. Dabbs	Horticulturist, Exp. Farm	Scott

11. ANNUAL REPORT OF FOREST BIOLOGY RANGER MEADOW LAKE DISTRICT OF SASKATCHEWAN

1956

by

G. T. Lalor

INTERIM REPORT - 1956

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

February, 1957

11.1 INTRODUCTION

Field surveys to determine the status of forest insect and tree diseases in the Meadow Lake District were conducted from May to to Sept. 15, 1956. Totals of 386 insect samples and 25 disease samples were collected in the Meadow Lake District. Approximately 20 insect samples were submitted by personnel of the Department of Natural Resources and private co-operators. Their assistance and co-operation throughout the season is gratefully acknowledged.

Cabin facilities for the ranger were purchased at Loon Lake early in 1956. This greatly improved working conditions for the ranger assigned to the district. Road building in the district continued throughout 1956 and several areas which were inaccessible may now be reached by motor vehicle.

11.2 REVIEW OF FOREST INSECTS AND TREE DISEASES

There were some important changes in the status of major forest insects in the Meadow Lake District in 1956. The larch sawfly was again light throughout the district. Slight increases in populations were observed at Pierceland and Loon Lake but a further decline occurred at Green Lake, Meadow Lake and Turtle Lake.

The large aspen tortrix defoliated trembling aspen over an area covering approximately 2,500 square miles. Small pockets of moderate to severe defoliation occurred at Fairholme, Makwa and Blue Bell. Elsewhere, defoliation was generally light. The American poplar leaf beetle was also present in areas infested with the large aspen tortrix. Light to moderate defoliation by this species occurred at St. Walburg. Elsewhere defoliation was light with only an occasional tree severely defoliated.

The yellow-headed spruce sawfly again caused severe defoliation of most white spruce shelterbelts in the Makwa area. Populations in natural stands appeared somewhat lighter than in 1955.

The black-headed budworm, which caused severe defoliation to white spruce shelterbelts and native white spruce stands in 1955, declined considerably and defoliation was negligible. The ugly nest tortrix, which was virtually absent in 1955, increased noticeably during 1956. Tents were numerous in the Loon Lake and Ministikwan Lake areas.

A needle rust of conifers, Chrysomyxa sp., which had subsided in 1955, was again common through the Meadow Lake Provincial Forest and in areas surrounding Pierceland, Lac Des Isles and Loon Lake. White spruce was infected in an area encompassing approximately 2,500 square miles.

During surveys conducted in mixed jack pine and lodgepole pine plantations in the Bronson Provincial Forest, it was observed that an occasional jack pine ranging in age from 2 to 5 years had been killed by the blister rust, Cronartium comandrae. Lodgepole pine was not affected.

11.3 INSECT CONDITIONS

11.3.1 Larch Sawfly, Pristiphora erichsonii (Htg.).

Prior to 1953 the larch sawfly infestation in the Meadow Lake District was concentrated mainly in the areas surrounding Green Lake, Meadow Lake, and the Meadow Lake Provincial Forest. In 1953, populations showed a marked increase in the Pierceland and Loon Lake areas. By 1954, tamarack stands in the western portion were severely infested but populations in the eastern areas had declined considerably. Severe flooding of swamps throughout the district in 1954 caused a high rate of larval drowning and in 1955 defoliation was light throughout. During 1956 no appreciable buildup of larch sawfly populations occurred in the Meadow Lake District. Figure 1 shows the distribution and relative abundance of larch sawfly as determined by ground and aerial surveys. Swamp and host tree conditions for larch sawfly survival were generally fair.

Surveys to determine the effects of past defoliation showed no significant tree mortality attributable to larch sawfly attack. Dead trees were common in the permanent sample plots but this mortality occurred in the co-dominant and overmature classes and was apparently due to factors other than the larch sawfly. At points where flooding had occurred, shoot production and growth were very poor and foliage sparse. At Pierceland some trees did not produce foliage until mid-summer. At Loon Lake (Plot #103), foliage production showed some improvement over 1955 but was still considered sparse. The same conditions existed at Green Lake, Meadow Lake and Turtle Lake. Adventitious growth was apparent on suppressed and overmature trees.

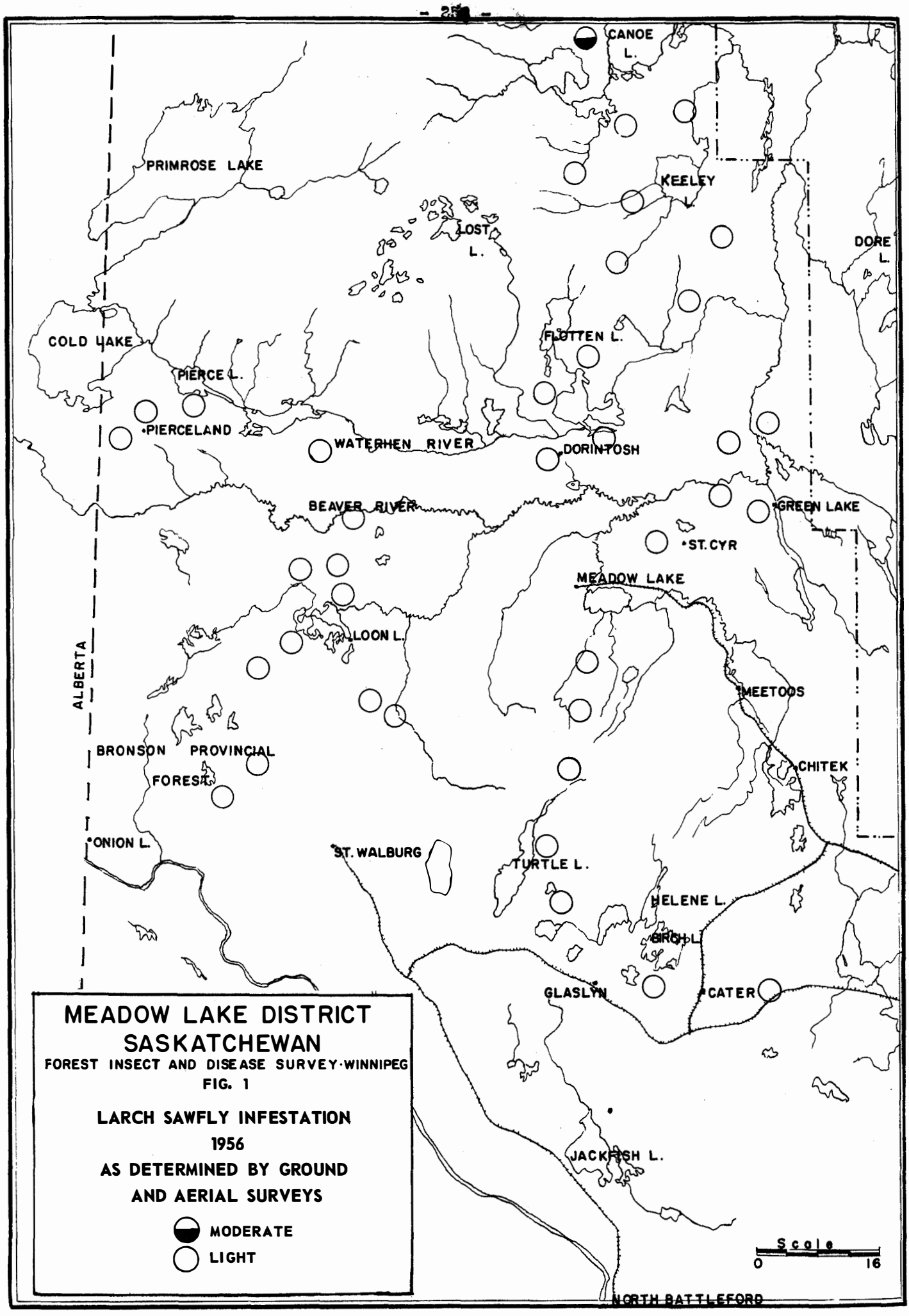
At points such as Loon Lake Beach and Steeles Narrows, where tamarack is growing on elevated and well-drained sites, conditions were entirely different. No tree mortality was recorded, shoot growth was good, and foliage production excellent.

Egg populations sampling was conducted at four permanent tamarack plots in the district. The infestations at each plot were rated on the basis of the percentage utilization of current shoots for oviposition by adult sawflies. Sample counts and infestation ratings are shown in Table 1.

Table 1.
Population Estimates of the Larch Sawfly
(based on sequential sampling of egg populations)

Plot	Location					Results of Sampling		
	Place	Sec.	Tp.	Rge.	Mer.	Total shoots counted	Total curled	Infestation rating
104	Pierceland	14	62	26	W3	50	0	light
103	Loon Lake	16	59	22	W3	50	0	light
102	Turtle Lake	34	53	18	W3	70	2	light
101	Meadow Lake	15	55	17	W3	50	0	light

During June, foliage production records were obtained at the same locations. Records were taken on ten tagged trees in each permanent plot. Following the larval drop period, the locations were again visited and defoliation estimates were made on sample trees. At all points defoliation was light--not exceeding fifteen per cent.



MEADOW LAKE DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY-WINNIPEG

FIG. 1

LARCH SAWFLY INFESTATION

1956

AS DETERMINED BY GROUND AND AERIAL SURVEYS

MODERATE

LIGHT

During surveys carried out in July and early August in the Loon Lake and Pierceland areas, it was noted that larch sawfly larvae showing parasite scars were more common than in previous years. For the purpose of further study, one hundred cocoons were collected from each area and later dissected at the Winnipeg laboratory. The location and results of the dissections are shown in Tables 2 and 3 respectively.

Table 2.
Areas from which Larch Sawfly Cocoons were collected for Parasite Studies
Meadow Lake District - 1956

Plot No.	Place	Sec.	Tp.	Rge.	Mer.	No. of cocoons collected
103	Loon Lake	16	59	22	W3rd	100
104	Pierceland	14	62	26	W3rd	100

Table 3.
Summary of Larch Sawfly Parasitism
(as determined by dissections)
Meadow Lake District - 1956

Plot No.	Place	No. of larvae containing Mesoleius		Percentage effective parasitism based on living sawfly larvae			Percentage larvae destroyed by disease	Percentage larvae dead from other causes
		Eggs	Larvae	B. harveyi	M. tenthredinis	T. klugii		
103	Loon Lake	0	4	31	6	0	30	3
104	Pierceland	4	0	26	0	18	31	14

During 1956 the parasite Bessa harveyi increased in the Loon Lake and Pierceland areas. There was no apparent change in Mesoleius tenthredinis populations. Tritneptis klugii Ratz. has occurred sporadically throughout the district in past years. It was absent from mass collections in 1955, but appeared again in 1956 and was responsible for destroying 18 per cent of the larvae in cocoons in collections taken from near Pierceland.

Three tamarack plots were established in 1949 and two in 1951 in the Meadow Lake District for the purpose of studying tamarack mortality caused by repeated annual larch sawfly attacks. The plots ranged in size from 1/4 to 1/2 acre. All living and dead trees were tallied and annual defoliation records were maintained for each plot. With the exception of one, inaccessible at the time, these plots were retallied in 1956, in order to determine the mortality. The percentage of loss by basal area together with defoliation records are shown in Table 4.

11.3.2 Large Aspen Tortrix and Associated Species.

The large aspen tortrix and other associated species caused light to severe defoliation of trembling aspen over an extensive area in 1954 and 1955. Some changes in the status of species involved were noted in 1955 and further changes were apparent in 1956. Figure 2 shows the distribution of large aspen tortrix for 1956.

The large aspen tortrix and American poplar leaf beetle had spread throughout the entire district. Defoliation was generally light with small pockets of severe defoliation at widely separated points. Other species of leaf rollers such as Epinotia nisella criddleana and Badebecia urticana were also present but defoliation attributed to them was negligible.

Table 4.

Summary of Permanent Tamarack Plots in the Meadow Lake District of Saskatchewan showing Percentage Dead Trees by Basal Area and History of Larch Sawfly Defoliation during Period shown by Tally Years

Percentage Wood Loss being the Cumulative Mortality

Plot No.	Tally year	Tamarack Only: d.b.h. Living trees Range	Tamarack Only: d.b.h. Living trees Average	Tamarack Only: d.b.h. Dead trees Range	Tamarack Only: d.b.h. Dead trees Average	Tamarack Only: Basal area Living	Tamarack Only: Basal area Dead	Tamarack Only: Basal area % loss	Total all species Basal area Living	Total all species Basal area Dead	Total all species Basal area % loss	Defoliation history of tamarack Year	Defoliation history of tamarack %	Remarks
101	1949	1-6	2.3	1-5	2.6	3.906	.407	9.44	5.691	.407	6.67	1949	nil	Disturbed-severe flooding in 1954. Mechanical damage (cutting) considerable
												1950	nil	
												1951	nil	
												1952	3.0	
	1956	1-6	1.9	1-6	3.2	4.524	1.474	24.57	7.113	1.67	27.02	1953	12.0	
												1954	66.0	
												1955	1.0	
												1956	nil	
102	1949	1-11	3.0	1-6	1.9	13.973	.508	3.51	14.543	2.398	14.16	1949	.05	Disturbed-severe flooding in 1954. Cattle grazing area
												1950	.05	
												1951	.07	
												1952	23.0	
	1956	1-11	4.0	1-7	3.1	10.419	1.728	14.22	11.208	1.733	13.39	1953	16.0	
												1954	61.0	
												1955	1.5	
												1956	nil	
103	1951	1-7	3.2	1-3	1.3	14.076	8.56	37.82	15.967	8.56	34.90	1951	nil	Undisturbed - severe flooding in 1954
												1952	5.0	
												1953	28.0	
	1956	1-11	3.8	1-7	1.8	10.359	2.818	21.38	12.134	2.939	19.50	1954	76.0	
												1955	7.0	
												1956	nil	
104	1951	1-10	22.0	1-4	1.1	25.173	3.189	11.25	25.173	3.189	11.24	1951	nil	Disturbed-considerable damage due to rodents. Flooding in /54.Some mechanical (cutting) damage. Suppression caused some mortality
												1952	3.0	
												1953	7.0	
	1956	1-10	3.6	1-9	1.5	32.128	8.415	20.75	32.128	8.415	20.76	1954	59.0	
												1955	6.0	
												1956	3.5	

Although large aspen tortrix spread considerably during 1956 and encompassed areas totalling approximately 2,500 square miles, defoliation was much lighter than the 1955 survey had indicated it would be. Populations in the Fairholme and Glaslyn areas, which had built up during 1955, declined considerably. This decline was probably due to late frosts which destroyed most of the early bud crop on trembling aspen.

A small pocket of severe defoliation occurred at Beaver River Crossing (sec. 10, tp. 68, rge. 21, W3rd mer.). At South Makwa (sec. 12, tp. 58, rge. 19, W3rd mer.) and North Makwa (sec. 38, tp. 58, rge. 19, W3rd mer.), clumps of trembling aspen on agricultural land were severely stripped. At all other points of inspection populations of this species were low and defoliation very light.

Heavy predation of large aspen tortrix pupae by ants, probably Formuca fusca was noted at Green Lake (sec. 10, tp. 61, rge. 13, W3rd mer.) on June 12. The same condition occurred in the Blue Bell area (sec. 22, tp. 59, rge. 20, W3rd mer.). It was noted that ant populations were confined, mainly, to sandy areas on the higher elevations.

American poplar leaf beetles were present on trembling aspen at most points of inspection throughout the district but with the exception of an occasional severely defoliated tree, caused only light defoliation.

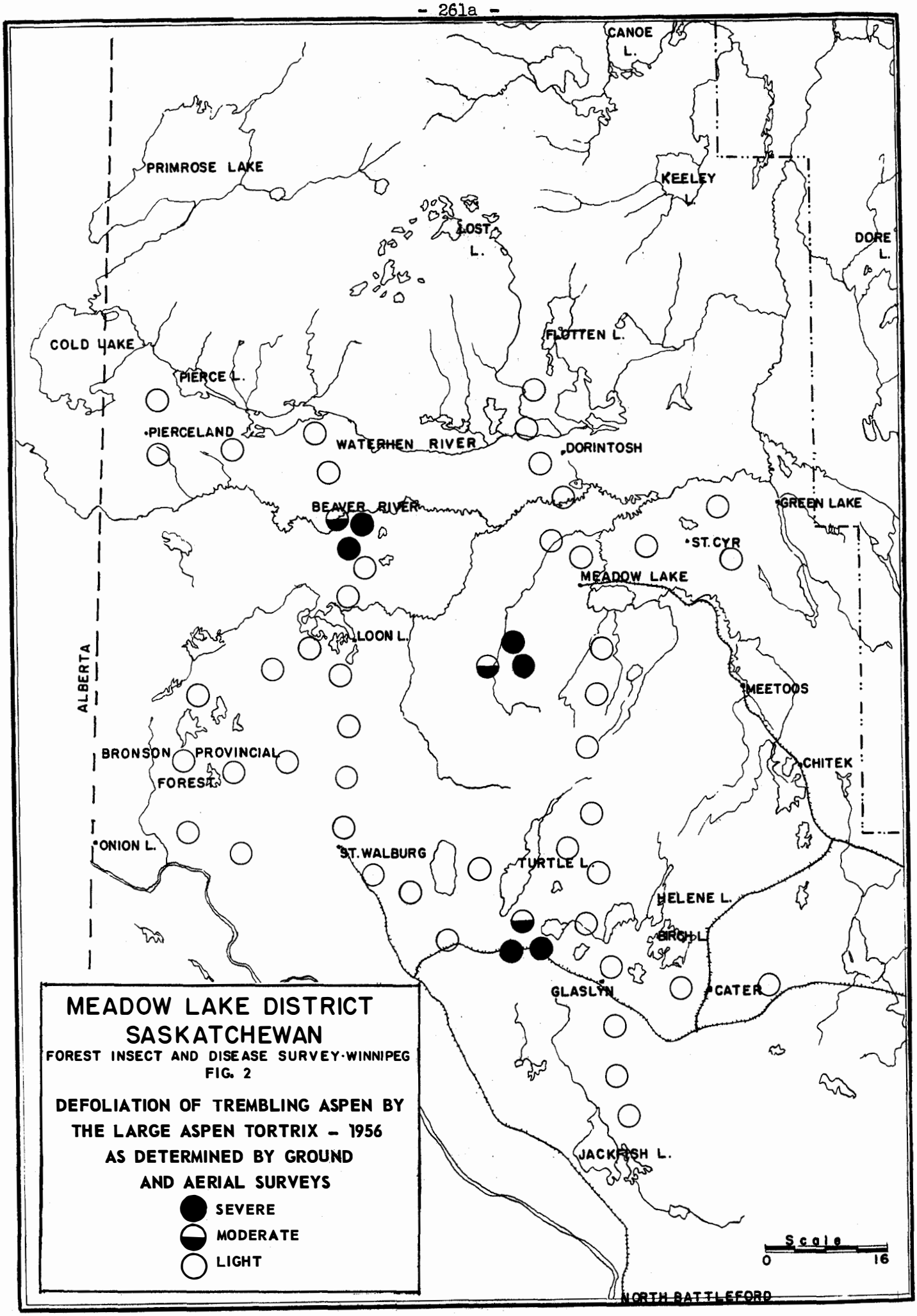
In the Makwa Lake area, where defoliation was severe in 1955, only moderate defoliation was recorded in 1956. Light defoliation with scattered pockets of moderate and an occasional very small pocket of severe defoliation prevailed throughout the Ministikwin area and south through the Bronson Provincial Forest. In the areas surrounding Blue Bell and Beacon Hill and north to the Beaver River defoliation was moderate with an occasional tree severely defoliated. It was noted that in these areas where tree ages range from five to fifteen years, the younger growth was most severely affected. South of St. Walburg only light attacks were apparent in 1956. Frost damage was severe in this area and may have been responsible for the reduction in populations. Between Green Lake and St. Cyr, where severe defoliation of trembling aspen occurred in 1955, no insects were found in 1956.

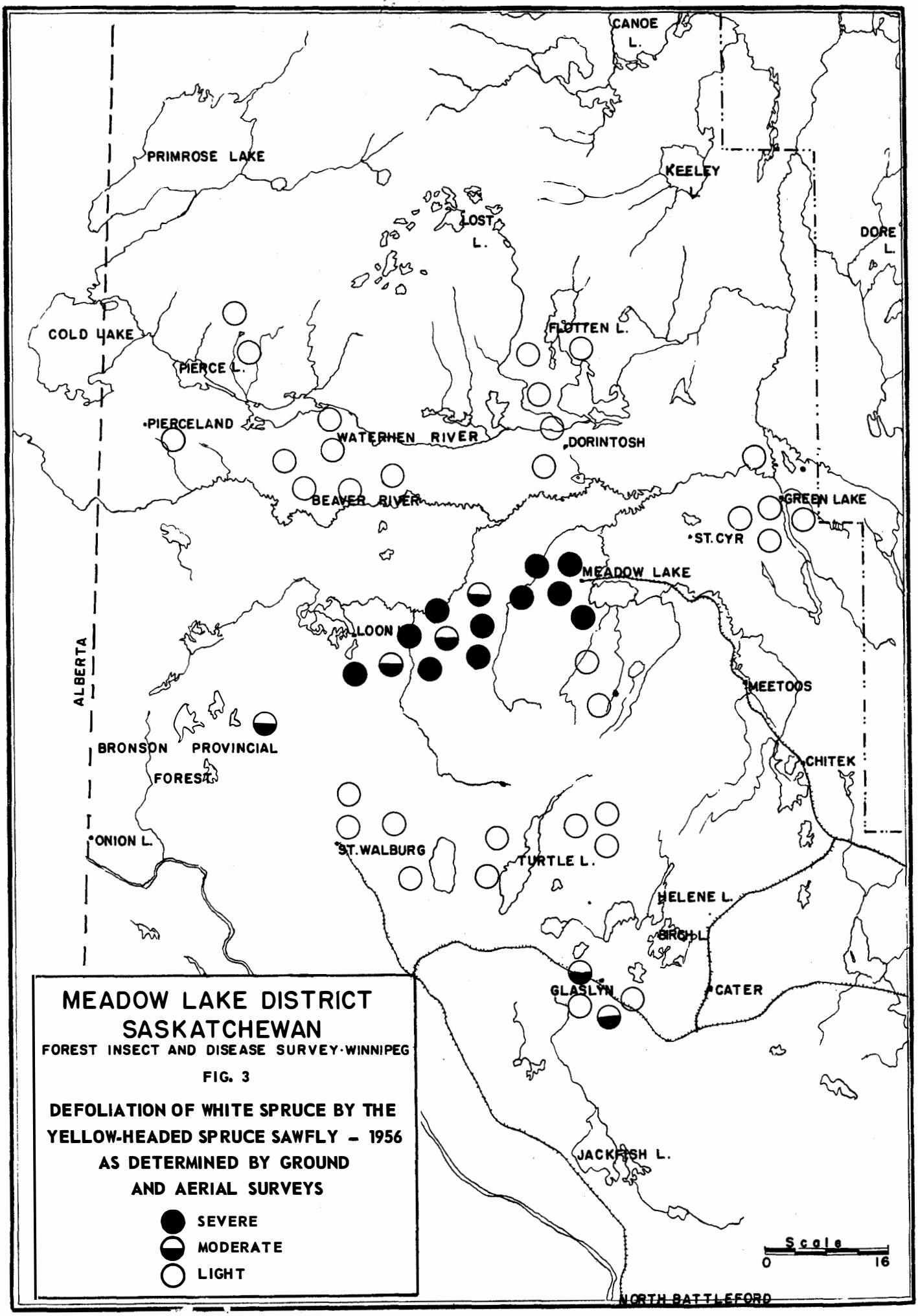
During this survey it was again noted that in sandy areas on higher elevations, ants were numerous and were feeding on American poplar leaf beetle larvae.

11.3.3 Yellow-headed Spruce Sawfly, Pikonema alaskensis (Roh.).

During 1955, the yellow-headed spruce sawfly caused defoliation to white spruce shelterbelts in the Meadow Lake, Green Lake, Makwa and Goodsoil areas. In 1956 the infestation continued. However, better timed spraying operations conducted by shelterbelt owners, under the direction of Agricultural Representatives and personnel of the Department of Natural Resources resulted in a marked reduction in defoliation. Figure 3 shows the distribution of this insect in 1956.

Prior to 1956 complaints from shelterbelt and ornamental tree owners had been dealt with individually. During 1954 when the yellow-headed spruce sawfly infestation reached serious proportions that method was found, not only


CANOE L.
PRIMROSE LAKE
KEELEY L.
LOST L.
DORE L.
COLD LAKE
FLOTTEN L.
PIERCE L.
PIERCELAND
WATERHEN RIVER
DORINTOSH
BEAVER RIVER
GREEN LAKE
ST. CYR
MEADOW LAKE
LOON L.
ALBERTA
MEETOOS
BRONSON PROVINCIAL FOREST
CHITEK
ONION L.
ST. WALBURG
TURTLE L.
HELENE L.
BIRCH L.
GLASLYN
CATER
JACKFISH L.
NORTH BATTLEFORD
MEADOW LAKE DISTRICT
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY-WINNIPEG
FIG. 2
DEFOLIATION OF TREMBLING ASPEN BY THE LARGE ASPEN TORTRIX - 1956 AS DETERMINED BY GROUND AND AERIAL SURVEYS
SEVERE
MODERATE
LIGHT
Scale
0
16



MEADOW LAKE DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY-WINNIPEG

FIG. 3

DEFOLIATION OF WHITE SPRUCE BY THE YELLOW-HEADED SPRUCE SAWFLY - 1956 AS DETERMINED BY GROUND AND AERIAL SURVEYS

- SEVERE
- MODERATE
- LIGHT

time-consuming for the Forest Biology Ranger, but ineffectual from the point of view of the shelterbelt owner. In many cases, where owners did spray, because of poor timing, results were very poor. In 1956, in order to eliminate unnecessary travel for the Forest Biology Ranger and at the same time supply the shelterbelt owners with the information necessary for them to conduct effective spraying operations, the following procedure was followed in the Meadow Lake District.

Between June 4 and June 6 adults of the yellow-headed spruce sawfly were observed ovipositing on native and ornamental white spruce. Agricultural representatives and Department of Natural Resources personnel in the district were notified to advise people interested in protecting their white spruce trees from damage by this sawfly to be prepared to spray about June 15. Notices, including recommended chemicals and procedures, were posted in local newspapers and the same information was handed out from local agricultural and Department of Natural Resources offices.

In the latter part of June a survey was made of shelterbelts in the district. Representative shelterbelts, both sprayed and unsprayed, growing in the same general area and subject to the same degree of attack in 1955 were examined. Sample 18 inch branch tips of white spruce were taken from the lower crowns and larval counts were made. In unsprayed locations, the counts ranged from 93 to 113 larvae per 18 inch tip and defoliation of new growth ranged from 75 to 100 per cent. In sprayed locations only an occasional larva remained on the trees and defoliation never exceeded 10 per cent.

In the Good soil area, spraying results were particularly good, no insects having been found on white spruce foliage and defoliation was negligible.

Between June 15 and July 15 an extensive survey was conducted of white spruce stands in the district. Low populations of this insect prevailed at Jeanette Lake and Steeles Narrows. The larvae were confined to open growing trees and to exposed branches on the fringe of dense stands. Results indicated that open growing trees may be more susceptible to attack than those growing on shaded locations. This condition was particularly evident in the Steeles Narrows and Jeanette Lake areas. At North Makwa two shelterbelts of about the same age and growing approximately one hundred yards apart were examined. One stand was carefully cultivated and the other had been completely neglected for about fifteen years. In the latter, other tree species such as trembling aspen, caragana and Manitoba maple had grown up cutting off the direct sunlight. The carefully tended belt had suffered severe defoliation repeatedly while the neglected belt was completely free from attack and showed no evidence of previous infestations. It was also noted that damaged or weakened trees seemed less susceptible to attack than vigorous trees. Near South Makwa, trees damaged by grazing cattle, although growing in a heavily infested belt were free from insects. These weakened trees had produced some new growth.

During early July a hymenopterous parasite was observed parasitizing yellow-headed spruce sawfly larvae. In order to determine the percentage of parasitism, one hundred cocoons were collected at South Makwa and later dissected at the Winnipeg Laboratory. Results of these dissections indicated that 4 per cent of the larvae were parasitized by a species of Hymenoptera and 8 per cent by a dipterous fly, probably Bessa harveyi. Dissections also indicated that disease organisms were responsible for a high mortality rate among yellow-headed spruce sawfly populations.

11.3.4 Species Complex Attacking Black and White Spruce.

During August and September 1955, a survey was conducted throughout the district to determine the extent of defoliation and damage to black and white spruce caused by a complex of species. This survey was continued in 1956 using the following method:

Trees in representative areas were selected for detailed sampling and observations. Sample trees of both species were selected for detailed sampling and examined and five branches:- one from the lower crown, one from the mid-crown and three from the upper crown were taken from each tree.

To separate species of insects and type of damage, each sample unit was divided into four separate insect samples according to the branch area on which they were feeding: (1) insects feeding on cones; (2) insects feeding on new foliage; (3) insects feeding on old foliage; and (4) insects for which feeding area could not be determined.

Seven locations were sampled using the above method. Sampling points at Makwa Lake and in the Meadow Lake Provincial Forest were sampled twice: once during June and again in September. Between June 15 and September 15, five other representative locations were sampled.

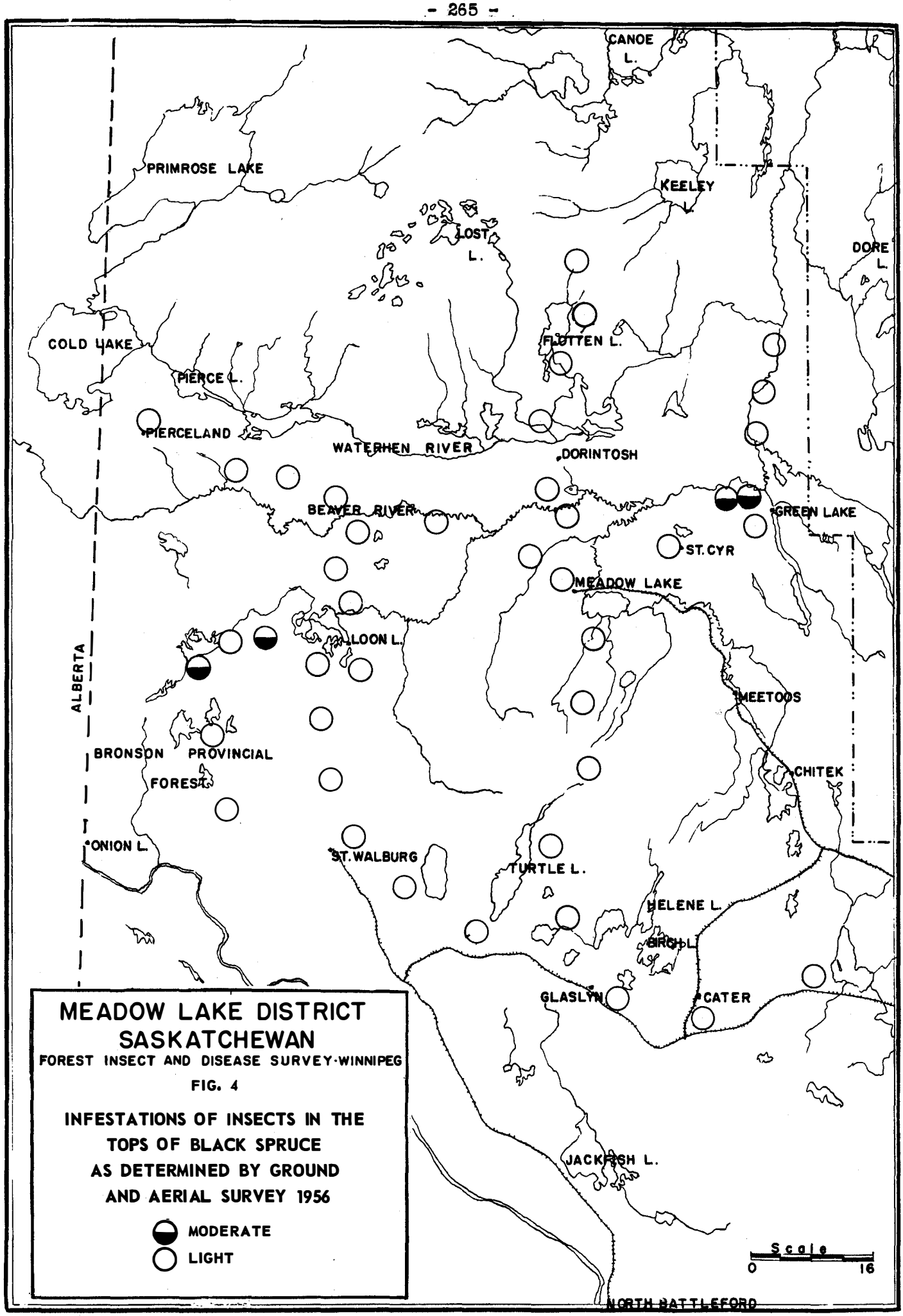
In the following table the insects found in the tops of black spruce are listed in order of their relative abundance.

Table 5.

Insect Species	Feeding Habits	Seasonal occurrence	Abundance	Remarks
Herculia thymetusalis	old & new foliage	May-Sept.	5 larvae	Found mainly in upper crowns of bS
Gelechiid sp.	needle miners	June-Aug.	4 larvae	Found in thick foliage of upper crowns of bS
Dioryctria abietella	cone borer	May-Sept.	2 larvae	20 per cent of cones damaged by this insect at one point
Archips alberta	old & current foliage	May-Sept.	1 larva	

11.3.5 Black-headed Budworm, Acleris variana (Fern.).

In 1956 damage due to this presence of this insect was negligible.



MEADOW LAKE DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY-WINNIPEG

FIG. 4

INFESTATIONS OF INSECTS IN THE TOPS OF BLACK SPRUCE AS DETERMINED BY GROUND AND AERIAL SURVEY 1956

MODERATE

LIGHT

11.3.6 Ugly Nest Tortrix, Archips cerasivorana (Fitch.).

This insect increased in abundance in 1956. In the areas surrounding Loon Lake, Steeles Narrows and Ministikwin Lake, nests were numerous on roadside shrubs.

11.4 TREE DISEASE CONDITIONS

11.4.1 Spruce Needle Rust, Chrysomyxa sp.

This spruce needle rust, which occurred over an extensive area in the Meadow Lake District in 1953 and 1954 and then subsided in 1955, was again prevalent. The accompanying map (Figure 5) shows the distribution of this disease in 1956. It was first observed in the Meadow Lake Provincial Forest during late July. Current foliage was 50 to 75 per cent infected which later increased from 75 to 100 per cent.

The infection was most severe in the Meadow Lake Provincial Forest and on the north shore of Pierce Lake. In both areas, white spruce was open growing and scattered. In the Flotten Lake, Green Lake, St. Cyr and Meadow Lake areas, infection was moderate with not more than 50 per cent of the current foliage affected. This same moderate condition prevailed in the Pierceland, Beaver River and Loon Lake areas. Black spruce throughout the district was only lightly infected.

11.4.2 Canker of Trembling Aspen, Hypoxylon pruinatum.

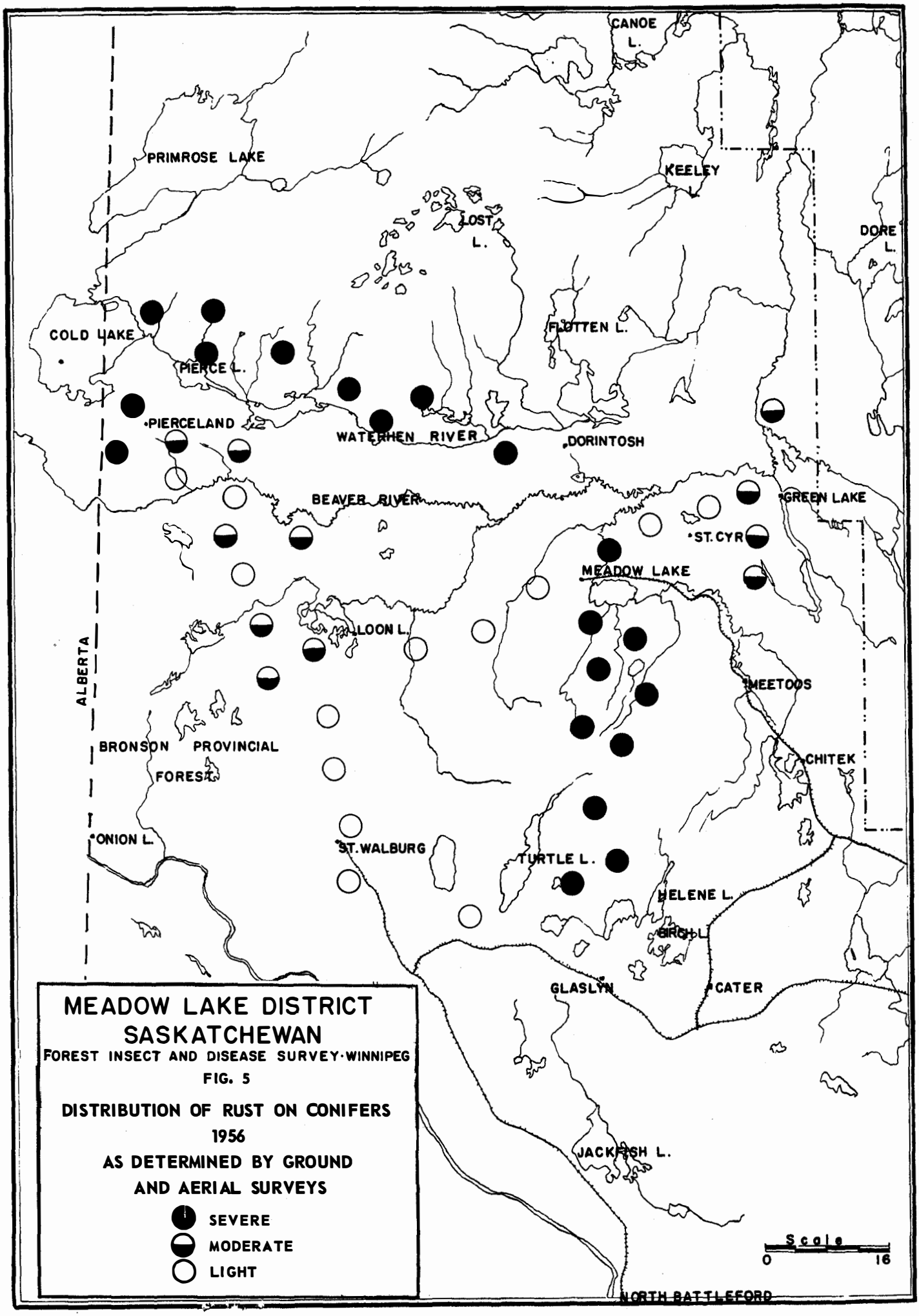
This canker, which occurs commonly on trembling aspen, was present in varying degrees of intensity at most points. The areas most heavily infected were around Jumbo and North Makwa lakes. Reports from the Saskatchewan Department of Natural Resources of heavy mortality of trembling aspen in the Jumbo Lake area were investigated during the summer. Results of the investigation showed this condition covering an area of approximately 300 square miles and extended from Jumbo Lake westward to Ministikwin Lake and north to the Beaver River. Throughout the infected area, ground fires had damaged the roots and weakened most of the trees. At North Makwa the heaviest infections were found in areas where the trees had been damaged and weakened by grazing cattle.

11.4.3 Blister Rust on Jack Pine, Cronartium comandrae.

This disease is common at most points where jack pine occurs in the Meadow Lake District. During a joint insect and disease survey of plantations in the Bronson Provincial Forest, it was noted that an occasional two year old jack pine had been killed by blister rust. It was also noted that lodgepole pine growing in the same plantation was unaffected.

11.4.4 Frost Damage to Trembling Aspen and Manitoba maple.

Throughout the district, particularly in and around the town of Meadow Lake, Manitoba maple trees were severely injured by frost. In the Paradise Hill and Frenchman's Butte areas damage to trembling aspen foliage was extensive. Approximately 50 per cent of the trees growing on northern exposures were dry and crumbled when disturbed. Trembling aspen foliage was also damaged by late frosts and St. Walburg.



MEADOW LAKE DISTRICT SASKATCHEWAN

FOREST INSECT AND DISEASE SURVEY · WINNIPEG

FIG. 5

DISTRIBUTION OF RUST ON CONIFERS

1956

AS DETERMINED BY GROUND AND AERIAL SURVEYS

- SEVERE
- MODERATE
- LIGHT

11.5 SPECIAL PROJECTS

11.5.1 Phenological Studies.

Phenological studies were conducted in the district for the purpose of preparing a phenological map for the region. Stations for this study were established at Flotten Lake, Pierceland, Green Lake, Loon Lake, Meadow Lake, and Cater. At each point, five trees of the following species: white spruce, trembling aspen, tamarack and jack pine were selected and one terminal, on a branch of each tree was tagged. Growth measurements were taken between June 2 and July 15 and again between September 2 and September 7.

The number of sample stations, their location and tree species is shown in Table 6.

Table 6.
Phenological Study Stations

Plot No.	Location	Tree Species	Sec.	Tp.	Rge.	Mer.
1	Meadow Lake P. F.	White spruce	21	52	17	W3rd
		Trembling aspen	21	52	17	W3rd
		Jack pine	6	54	16	W3rd
		Tamarack	6	54	16	W3rd
2	Cater	Trembling aspen	6	51	14	W3rd
		White spruce	6	51	14	W3rd
3	Loon Lake	White spruce	16	59	22	W3rd
		Trembling aspen	16	59	22	W3rd
		Jack pine	16	59	22	W3rd
		Tamarack	16	59	22	W3rd
4	Flotten Lake	Jack pine	31	64	17	W3rd
		Tamarack	30	63	17	W3rd
		Trembling aspen	31	64	17	W3rd
		White spruce	31	64	17	W3rd
5	Green Lake	Trembling aspen	30	62	12	W3rd
		Tamarack	18	61	13	W3rd
		Jack pine	17	62	12	W3rd
		White spruce	30	62	12	W3rd
6	Pierceland	Trembling aspen	14	62	26	W3rd
		Black spruce	14	62	26	W3rd
		Tamarack	14	62	26	W3rd
		Jack pine	17	62	26	W3rd

11.5.2 Study of the Reproductive Capacity of the Larch Sawfly.

Larval drop trays were again maintained for the collection of cocoons of the larch sawfly in a tamarack stand at Pierceland for Mr. R. J. Heron of the Winnipeg Laboratory. Twenty such trays containing sphagnum moss were set up during the last week of June. Following the conclusion of the larval drop period, the moss from the trays was gathered and placed in plastic bags and shipped to Winnipeg. The material is being used in a long term project to study the changes in the reproduction capacity of the larch sawfly in relation

to fluctuations in population density. Pierceland was chosen as a study site because of the current outbreak of larch sawfly.

11.5.3 Special Collections.

A number of special collections were made for personnel of the Winnipeg Laboratory in 1956. The number and type of collections are shown in the following table.

Table 7.
Summary of Special Collections

Type and purpose of collection	No. of Collections	Time spent making collection
Yellow-headed spruce sawfly cocoons (parasite study)	2 100 larvae each	2 days
Aphids for G. A. Bradley, Winnipeg Laboratory	5	1/2 day
Larch sawfly larvae, J. Muldrew, Wpg. Lab.	1 1000 larvae	1 1/2 days
Larch sawfly cocoons parasite studies	2 100 larvae each	2 days
Special larch sawfly cocoon collections for J. Heron	2	12 days

11.6 SUMMARY OF INSECT AND TREE DISEASE COLLECTIONS

A total of 366 insect and 25 disease samples were collected in the Meadow Lake District. The following table is a summary of collections from the principal tree species.

Table 8.

Host Tree	Insect Collections		Disease Collections
	Submitted by Forest Biology Personnel	Submitted by Co-operators	Submitted by Biology Rangers
White spruce	153	3	10
Black spruce	140		5
Jack pine	5		2
Tamarack	13		
Trembling aspen	31	16	3
Balsam poplar	6		2
White birch	5		
Manitoba maple	4	1	3
Chokecherry	3		
Willow	3		
Alder	3		
TOTALS	366	20	25

11.7 PERSONNEL CONTACTED

The following is a summary of co-operators contacted during the 1956 season.

Table 9.

Name	Address	Service Title	No. of Contacts
A. Hansen	Meadow Lake	District Superintendent	5
H. Stav	Meadow Lake	Field Supervisor	2
W. Crothers	Glaslyn	Field Officer	2
G. Fladiger	Meadow Lake	Conservation Officer	3
N. Mazurak	Meadow Lake	Radio Operator	3
B. Shannon	Green Lake	Field Officer	4
D. Smith	Loon Lake	Field Officer	15
F. Arsenault	Pierceland	Field Officer	3
D. Burant	Goodsoil	Field Officer	4
L. Reznechenko	St. Walburg	Field Officer	2
C. Ferguson	Dorintosh	Conservation Officer	1
S. Seivwright	Meadow Lake	D.N.R. Pilot	1