ANNUAL REPORTS OF THE FOREST BIOLOGY RANGERS

MANITOBA AND SASKATCHEWAN

1958

by

V. Hildahl, L.L. McDowall, A.E. Campbell, M.R. Pratt, K. Mortensen,
J.J. Lawrence, J.B. Martin, A. Machuk, J.A. Drouin,
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INTERIM REPORT 1958 – 6
FOREST BIOLOGY LABORATORY
WINNIPEG, MANITOBA

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TABLE OF CONTENTS

Maps and Photographs

1. SUMMARY OF FOREST BIOLOGY RANGER ACTIVITIES AND FOREST INSECT AND TREE DISEASE CONDITIONS IN MANITOBA AND SASKATCHEWAN - 1958

by

V. Hildahl

1.1 INTRODUCTION

The 1958 field season in Manitoba and Saskatchewan extended from mid-May through October. Special sampling was directed toward developing new appraisal techniques for the fall cankerworm, boxelder twig borer and white grubs. Morris's (1) sampling technique for spruce budworm egg surveys was applied again to balsam-fir stands through southern and eastern Manitoba. The sequential sampling technique developed by Ives and Prentice (2) for assessing larch sawfly egg populations was used at all permanent tamarack plots. A new procedure was used to determine the occurrence of white-pocket rot, Polyporus tomentosus, in mature stands of white and black spruce in 22 one-acre plots through the forested areas of the two provinces. Damage to white spruce by the root weevil, Hylobius (3) sp., was appraised in conjunction with the above study. Mortality studies relating to root-collar weevil in pine plantations in the Sandilands Forest Reserve and the effects of severe defoliation to exotic pines by the jack-pine budworm in the Spruce Woods Forest Reserve were continued. Details on sampling procedures not referred to in publications are outlined in section 1.5 of this report.

Comparatively dry weather prevailed over most of the survey regions, which resulted in very little time being lost due to rain. Improved road systems also added significantly to better coverage of the more inaccessible districts. Additional aircraft travel, both chartered and non-chartered, was used in 1958 and resulted in more adequate coverage of the timber stands in the northern regions of the two provinces. Approximately 130,000 miles were travelled by road, 15,000 miles by air, and 600 miles by boat.

The excellent co-operation from the provincial and dominion forest services continued in 1958. They provided aircraft travel for aerial surveys of inaccessible areas and boating equipment for coverage of some of the waterways. Woods operators also extended their services in numerous ways to the Forest Biology Rangers in the field. The co-operation and assistance received from these agencies is gratefully acknowledged.

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(1) Morris, R. F. A sequential sampling technique for spruce budworm egg surveys. Can. Jour. Zool. 32: 302-313. 1954.

(2) Ives, W. G. H. and Prentice, R. M. A sequential sampling technique for surveys of the larch sawfly. Can. Ent. 90: 331-338. 1958.

(3) Warren, G. L. The effect of some site factors on the abundance of Hymomolyx piceus. Ecology, Vol. 37, No. 1. 1956.

A summary of the aircraft travel, allocation of ranger time by survey sub-projects, and the number of insect and tree disease samples submitted by district is given in tables 1, 2 and 3 respectively.

Table 1

Chartered and Non-Chartered Aircraft Travel
Manitoba and Saskatchewan
1958

Province	Type of Aircraft	Total No. of hours	No. of man-hours flown	Approx. mileage	Approx. area surveyed (sq. mi.)(3)
Manitoba	(1) Cessna 180	36.0	60	3,850	15,400
	(1) Cessna 175	15.0	40	1,875	7,400
	(2) Cessna 180	5.0	10	600	2,400
	(2) Beaver	21.0	60	2,625	10,500
Saskatchewan	(1) Cessna 180	17.5	35	2,200	8,800
	(1) Cessna 175	3.0	6	350	1,400
	(2) Cessna 180	19.5	32	2,325	9,300
	(2) Cessna 140	5.0	5	400	1,600
	(2) Super Cub	7.0	7	800	3,200
	Total	129.0	255	15,025	60,000

(1) Chartered Aircraft; (2) non-chartered, supplied by Provincial Forest Services; (3) based on observation of 2 miles on each side of flight lines.

1.2 SUMMARY OF IMPORTANT INSECTS AND TREE DISEASES

The most striking damage to trees in 1958 was weather injury (Cayford et al*). Unseasonal temperatures and sub-normal precipitation in late winter and early spring resulted in severe "winter-drying" and frost injury to all tree species over an extensive area of southern Manitoba and Saskatchewan. These abnormal conditions had an adverse effect on most insect infestations occurring within the area. A general decline of the spruce budworm infestation was noted along the Wanipigow and Manigotagan watersheds and through southern Manitoba. The infestation at Namew Lake, which lies north of the weather injury area, increased in size and intensity. White spruce over an area of four square miles on the Cypress Hills were again defoliated. Infestations of the jack-pine budworm sub-

* Cayford, J. H., Hildahl, V., Nairn, L. D., and Wheaton, M. P. H. Injury to trees from winter drying and frost in Manitoba and Saskatchewan in 1958. In press.

Table 2

Time spent in days on Survey Sub-Project by the Forest Biology Rangers
Manitoba and Saskatchewan - 1958

For. Biol. Ranger	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
L. L. McDowall	2	-	-	2	-	5	4	2	4	--	--	2	3	--	22
A. E. Campbell	3	-	-	4	-	9	5	4	-	1	--	4	1	--	31
K. L. Mortensen	-	6	3	1	12	5	2	-	-	--	--	2	7	--	38
M. R. Pratt	.5	6.5	-	4	-	8	5	4	9	1/2	--	4	8	--	49.5
J. J. Lawrence	1	-	1	1	8	5	8	2	-	--	--	4	2	--	32
J. B. Martin	2	-	-	4	-	3	4.5	-	-	1	--	4	5	--	23.5
A. Machuk	5	-	-	-	6.5	4	8	1	-	--	--	5	6	--	35.5
J. A. Drouin	3	-	-	-	4	8	7	1	2	1	5	8	8	6	53
B. B. McLeod	2	3	-	-	6	8	7	-	-	2	1	5	2	4	40
G. T. Lalor	2	6.5	1	-	-	10.5	-	-	1	--	--	5.5	6.5	1	34

1. Sequential sampling of larch sawfly
2. Boxelder twig borer sampling
3. Fall cankerworm sampling
4. Sampling spruce budworm egg populations
5. Sampling forest tent caterpillar egg populations
6. Permanent sample plot and station studies
7. P. tomentosus and Hylobius sp. studies
8. White grub surveys
9. Plantation surveys
10. Black spruce complex study
11. Xyelid sp. study
12. Phenological studies
13. Mass collections of insects
14. Poplar borer study

Table 3

Summary of Insect and Tree Disease Samples by District from the Principal Tree Species in Manitoba and Saskatchewan

District	Host Tree												
	wS		bS		bF		jP		tL		tA		bPo		wB		mM		wE		Misc.		Total
	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	
Southern Manitoba	47	2	5	1	11	-	78	2	24	-	82	4	23	0	14	0	11	0	4	1	79	4	392
Eastern Manitoba	51	7	22	4	90	2	102	1	33	0	114	7	12	0	27	11	2	0	1	0	105	6	597
Southern Saskatchewan	51	0	0	0	0	0	1	0	2	0	185	4	1	0	1	0	37	0	5	0	91	5	383
Western Manitoba	98	11	15	3	1	0	11	1	66	5	69	1	3	0	8	1	3	0	0	0	22	0	318
Northern Manitoba	44	7	13	3	5	0	39	7	27	0	51	9	4	0	24	2	12	0	0	0	42	0	289
Hudson Bay Saskatchewan	59	3	2	2	9	1	42	3	49	0	129	8	3	0	11	1	8	0	2	0	47	1	380
Prince Albert Saskatchewan	24	1	19	6	10	1	107	2	23	2	138	6	14	1	11	0	10	0	0	0	53	0	428
Northern Saskatchewan	14	4	19	4	4	2	31	3	28	2	53	3	8	0	9	0	0	0	0	0	45	2	231
Meadow Lake Saskatchewan	29	4	6	0	0	0	13	0	14	6	77	0	16	0	6	0	18	0	0	0	27	2	218
West-Central Saskatchewan	21	0	0	0	0	0	0	0	1	0	59	1	10	0	0	0	42	0	2	0	18	3	157
Totals	438	39	101	23	130	6	424	19	267	15	957	43	94	1	111	15	143	0	14	1	529	23	3393

I - insect; D - tree disease samples

sided in the Sandilands and Spruce Woods Forest reserves, while slightly increased populations were recorded in the Stead-Belair area. The status of the larch sawfly remained unchanged in 1958; severe infestations were still centred north of the Churchill River. The infestation of large aspen tortrix subsided; severe defoliation was recorded only along the southern slopes of the Duck Mountain Forest Reserve and through portions of the Hudson Bay and Prince Albert districts of Saskatchewan. Increased activity of the forest tent caterpillar indicates that we may again be on the verge of an outbreak of this defoliator of aspen.

Tree disease surveys indicated no new areas of major infections. The known range of the jack-pine mistletoe was extended north to René Lake (58 parallel of latitude) in Saskatchewan. The parasitic fungus, Wallrothiella arceuthobii was present on the mistletoe plants in this area. The white-pocket rot, caused by the fungus Polyporus tomentosus, was recorded in fifteen of twenty-two spruce stands examined. A complex of factors, including the fungus Armillaria mellea, is causing considerable mortality of tamarack in central and northwestern Saskatchewan.

1.3 DEFOLIATION CLASSES FOR CONIFEROUS AND DECIDUOUS TREES

Defoliation estimates by Forest Biology Rangers are based on ocular examination of defoliated trees and are subject to considerable human error. In the past, some observers have estimated defoliation in per cent while others have used the rather broad classes of light, moderate and severe. These are the three classes usually used for mapping infestation. In order to adapt a somewhat more standard classification for defoliation the following methods have been adapted and apply to -

1.3.1 Defoliation of Deciduous Trees

Five classes are defined for deciduous trees, based on the percentage of the total foliage in the crown.

Nil - no visible defoliation
Light - trace to 20 per cent defoliation
Moderate - 30 to 60 per cent defoliation
Severe - 70 to 90 per cent defoliation
Complete - no foliage left in the crown

Defoliation which can be seen from the air falls into one of the last three classes.

The above classification is also used for leaf skeletonizers. The per cent figures represent the percentage of leaves showing skeletonizer damage.

1.3.2 Defoliation of Coniferous Trees

Spruce and Pines.-

Ground Surveys -

Nil - no perceptible defoliation of current growth
Light - trace to 20 per cent defoliation of current foliage

Moderate - 30 to 60 per cent loss of current foliage
Severe - 70 to 90 per cent loss of current foliage
Complete - loss of all current foliage

The last two classes are modified by a statement on the percentage of back-feeding on last years foliage.

Aerial Surveys -

Only two classes of defoliation can be differentiated from the air.

Moderate - slight reddish appearance of foliage
Severe - complete or distinct red appearance of foliage

Tamarack

Studies of foliage distribution in the various crown types of tamarack have been carried out during the past 3 years. The studies have indicated that there is no significant differences in the proportion of the total foliage found in the upper, mid, and lower crown levels of the different crown classes of tamarack.

Based on 29 trees the following average per cent distribution by crown level has been shown.

Upper - 17
Mid - 45
Lower - 38

These figures are now used for refined per cent defoliation estimates of sample trees in permanent study plots. Outside of permanent plots they are also used as a guide in estimating defoliation in the following broad classes.

Light - 0 to 20 per cent defoliation
Moderate - 30 to 60 per cent defoliation
Severe - 70 to 100 per cent defoliation

Note: Complete details of defoliation survey techniques for tamarack will be outlined by Nairn and Prentice.

1.4 SUMMARY OF FIELD ACTIVITIES

1.4.1 Organization of Ranger Staff

One change was made in the organization of the ranger staff in 1958. Owing to the heavy survey program outlined for southeastern Manitoba, the ranger from the West-Central District of Saskatchewan was moved to Manitoba and made responsible for surveys in a temporary district consisting of parts of the Southern and Eastern districts. A separate report was not prepared for this region as it was established on a temporary

basis and not assigned a Survey District number. The data accumulated by the ranger during the season was included in the Annual Ranger Reports for the Southern and Eastern districts. Similarly, the rangers working in the Meadow Lake and Northern districts of Saskatchewan were made responsible for surveys of the vacated West-Central District.

The rangers responsible for forest insect and tree disease surveys are shown by Survey Region and District in Table 4. For interpretation of Table 1 the reader is referred to the accompanying map.

Table 4

Survey Region and Ranger District Assignments
Manitoba and Saskatchewan
1958

Survey Region	Forest Biology Ranger	Forest District	District No.
Southeastern	L. L. McDowall* and M. R. Pratt	Southern District, Manitoba	1
	A. E. Campbell and M. R. Pratt	Eastern District, Manitoba	2
	K. L. Mortensen	Southern District, Saskatchewan	10
Central	J. J. Lawrence*	Western District, Manitoba	3
	J. B. Martin	Northern District, Manitoba	4
	A. Machuk	Hudson Bay District, Saskatchewan	5
Northwestern	J. A. Drouin*	Prince Albert District, Saskatchewan	6
	B. B. McLeod	Northern District, Saskatchewan	8
	G. T. Lalor	Meadow Lake District, Saskatchewan	7
	B. B. McLeod and G. T. Lalor	West-Central District, Saskatchewan	9

* Ranger responsible for co-ordinating surveys within a Survey Region.

1.4.2 Field Accomodation

No change was made in 1958 in the amount of field accomodation that is available to the forest biology ranger staff. Some improvements were made in existing facilities. The interior of the cabin located at Loon Lake was completed and a temporary cold-water system installed in the duplex cabin located near Prince Albert, Saskatchewan.

1.4.3 Transportation Equipment

Three new sedan deliveries were added to the fleet of ranger vehicles. Two were replacements for units that were previously in operation in the Eastern District of Manitoba and the Hudson Bay District of Saskatchewan. The third was a replacement for the unit from the Northern District of Manitoba that was involved in an accident early in the field season and damaged beyond repair.

1.5 SPECIAL SAMPLING AND SURVEY SUB-PROJECTS

A number of special sampling and Survey sub-projects were carried out in the field by the Forest Biology Rangers. To avoid repetition, only the summarized data are included in individual district reports. Techniques and methods pertaining to these special studies are outlined briefly below.

1.5.1 Population Sampling of Boxelder Twig Borer

This study has been in progress since 1956. Sampling is conducted at 33 plots in four of the forest districts where the host tree, Manitoba maple, is commonly found. Trees have been sampled using the following technique.

1. Five sample trees representative of the stand were selected at each plot and tagged for future reference.

2. The height, crown depth and crown width were recorded annually.

3. From each tree, one branch (36 inches long) is removed from each of the 4 cardinal points at each of three crown levels (lower, mid and upper). The total number of twigs and the number infested with boxelder twig borer were recorded according to origin of branch on the tree. A special form is used for recording data. The per cent infested twigs is used as a population index.

1.5.2 Population Sampling of the Fall Cankerworm

This study has been in progress since 1956 at 7 plots in the southern regions of Manitoba and Saskatchewan. Sampling is carried out during the 4th and 5th larval instars using the following technique.

1. Five sample trees representative of the stand were selected at each plot and tagged for future reference.

2. The height, crown depth and crown width are recorded annually.

3. From each tree, sample branches were removed from the four cardinal points at each of three crown levels (lower, mid and upper), starting in the lower crown to avoid disturbing the feeding larvae. Branches were placed on a beating sheet for counting of larvae.

4. The total number of leaf clusters on each branch and the number of "free larvae" on the sheet were recorded. The number of free larvae were divided by the number of leaf clusters to ascertain the average number of "free larvae" per leaf cluster.

5. The number of larvae on four randomly selected leaf clusters per branch were counted and the "free larvae" average added to give the number of larvae per leaf cluster. The number of leaves per leaf cluster on the four sample clusters was recorded.

6. The percentage of defoliation was recorded at the time of the population counts and again when feeding by the fall canker-worm was completed. Population counts will be related to defoliation estimates to define infestation classes. Basic sampling data will be analyzed and sequential sampling technique developed for this species.

1.5.3 Larch Sawfly Cocoon Collections

The method of collecting larch sawfly cocoons was modified to obtain more refined estimates of the parasite, Bessa harveyii. Two-hundred larval-drop trays, each 2 feet square and 10 inches deep, were placed out in permanent tamarack plots in late July. Twenty trays were set out in each plot and distributed as follows:

District	No. of Trays	No. of Plots
Western Manitoba	40	2
Northern Manitoba	40	2
Prince Albert, Saskatchewan	40	2
Northern Saskatchewan	40	2
Meadow Lake, Saskatchewan	40	2

The trays were filled to a depth of 3 inches with clean moss, which had been checked for old larch sawfly cocoons or other contamination. The trays were placed under trees with heavy canopy and away from the periphery of the swamp. After larval drop was completed, the moss was collected and shipped to the Winnipeg Laboratory where it was examined for larch sawfly cocoons. The cocoons were subsequently examined and dissected

to determine the incidence of Bessa harveyii attacking larch sawfly larvae. This technique of collecting cocoons allows for more accurate appraisal of this parasite in that both the fall emerging and spring emerging portion of Bessa population is measured.

1.5.4 Phenological Survey

A phenological study was initiated in Manitoba and Saskatchewan in 1956. Since that time, measurements of the terminal growth of jack-pine, tamarack, white spruce and trembling aspen have been taken semi-annually at survey stations and twice weekly at two reference stations. Only open-growing or otherwise exposed trees are used; all measurements being taken on the western exposure of the tree for uniformity. One dominant terminal at about eye level was tagged for the first and all subsequent measurements on five trees of each species. In the fall of 1958 past phenological records were summarized. This data was a valuable contribution to studies on the effects of weather on growth of trees.

Procedure at Reference Stations.- Measurements commence about May 10 and are taken twice weekly through September. The first and all subsequent measurements taken from the base of the bud. Since the first measurement is usually only the bud length, it is subtracted at the end of the season to give total terminal growth.

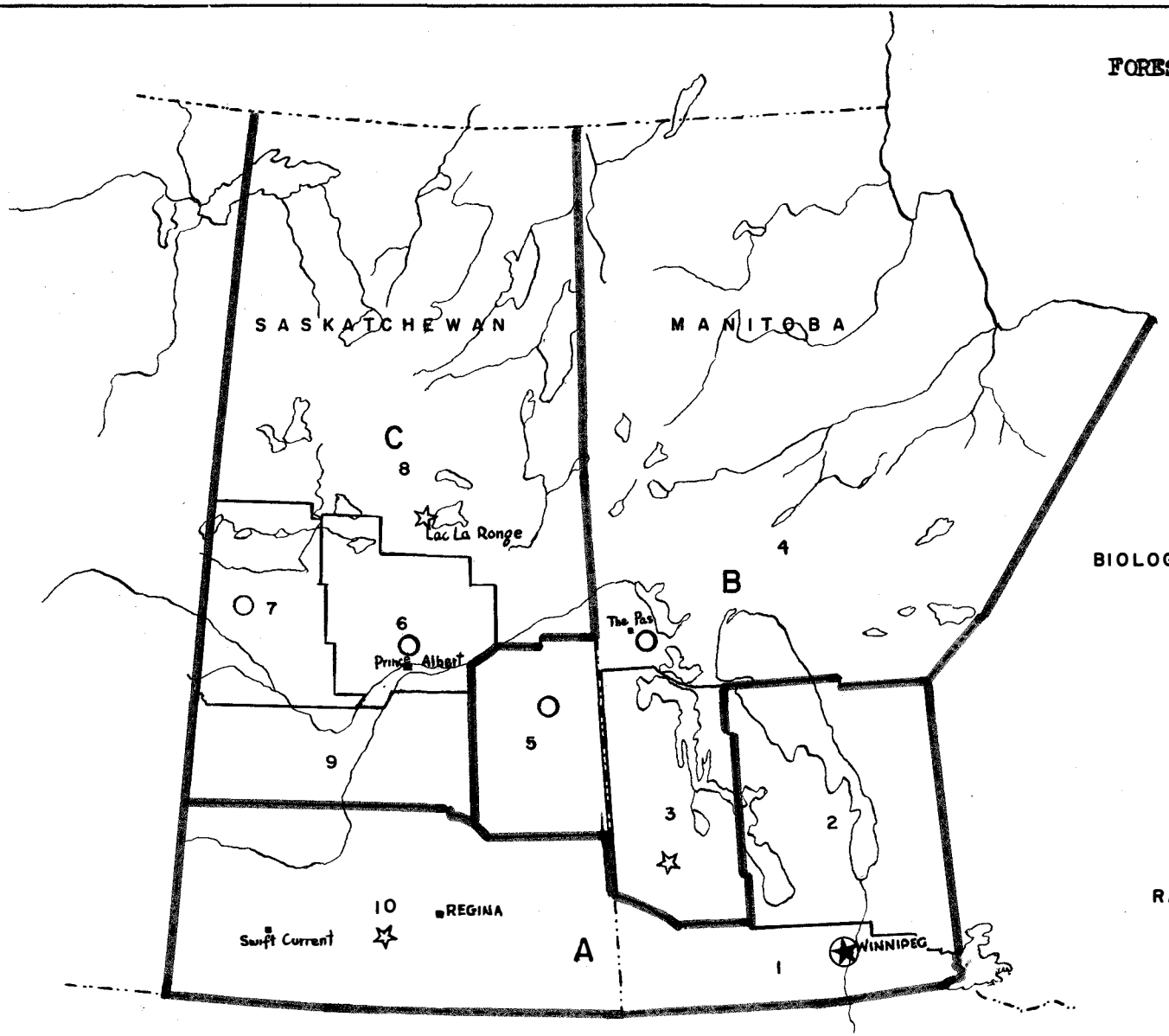
Procedure at Survey Stations.- The first measurement taken when about 25 per cent of terminal growth is completed (June 10-15); this measurement includes the bud. The second and final measurement of the tagged terminal shoot taken after growth is complete (September 1-15).

1.5.5 Surveys to Determine the Incidence of Polyporus tomentosus

Objectives.- To locate stands in which white and black spruce is or will be a major component where the disease occurs and to determine the incidence of the disease in such stands.

Mortality Estimate Methods.- A 1-acre strip, 20 chains long and 1/2 chain wide, was cruised for spruce mortality. Only dominant and co-dominant dead trees were recorded. Mortality was recorded according to patches (4 or more trees), groups (2-3 trees) and single dead trees per acre.

Sample Tree Records.- (1) In five dominant or co-dominant recently killed trees, the main roots within two feet of the base were examined for white-pocket rot, P. tomentosus. Sample trees were selected in patches where available, or from groups or single dead trees and recorded on special forms accordingly. (2) The roots were classified as follows: Healthy - solid and no reddish stain; Decayed - red stain, white-pocket, brown cubical, etc.; Decomposed - root so badly decayed that the wood would not hold together in the entire cross-section of the root. (3) The number of sporophores of P. tomentosus within 10 feet or occurring on the base of the tree were recorded. (4) One typical sample from each of two decayed roots on each of the five sample trees was submitted to the laboratory for study.



FOREST INSECT AND DISEASE SURVEY

SUPERVISORY REGIONS

A - Southeastern
B - Central
C - Northwestern

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 RANGERS

SOUTHERN DISTRICT OF MANITOBA

1958

by

L. L. McDowall and M. R. Pratt

INTERIM REPORT - 1958

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

March, 1959

2.1 INTRODUCTION

Field surveys to determine the prevalence of forest insects and tree diseases were conducted in the Southern District of Manitoba from early May until the latter part of October, 1958.

Major insect outbreaks were mapped and systematic sampling of minor insects was conducted at many points.

A number of mass collections was made for personnel of the Winnipeg and Sault Ste. Marie laboratories. Sequential sampling of the larch sawfly and phenological studies were again carried out. Surveys were conducted of pine plantations in the Spruce Woods Forest Reserve to determine tree mortality caused by the jack-pine budworm and in the Sandilands Forest Reserve for the pine root collar weevil.

Ten additional flying hours were allotted for southern Manitoba in 1958 and aerial surveys were extended.

A total of 394 insect and 17 tree disease collections were made in 1958. The co-operation and assistance received from Provincial Government Forestry Personnel and other agencies is gratefully acknowledged.

2.2 REVIEW OF FOREST INSECT AND TREE DISEASES

There were several changes in the status of some insect pests in the Southern District in 1958. The most notable change was in the general decline of the jack-pine budworm in both the Sandilands and Spruce Woods forest reserves.

A sharp decline in populations of the spruce budworm was also recorded in southeastern Manitoba. This was attributed partially to adverse weather conditions which prevailed from mid-winter to late May.

Populations of the larch sawfly remained much the same as in 1957, although a slight increase was recorded in one or two larch swamps in the central part of the Sandilands Forest Reserve.

Increased tree mortality caused by the pine root collar weevil was recorded in Scots pine plantations in the Sandilands Forest Reserve.

Pine tortoise scale on jack-pine appeared to be more widespread and was causing visible injury in the more heavily infested areas.

Surveys for tree diseases indicated that no major changes occurred in the abundance and distribution of the more important diseases.

2.2 INSECT CONDITIONS

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

Surveys for this insect in 1958 indicated that, although several scattered pockets of moderate defoliation were recorded, overall defoliation was light (Fig. 1). Poor foliage production was recorded in a number of areas caused by late spring frosts. Surveys for the distribution

and abundance of this insect covered a more extensive area and required ten additional hours of flying time. Light defoliation was recorded in the large tamarack stands north of Middlebro to Moose Lake, west to Whitemouth Lake and south to Sprague and South Junction. Larch swamps in the vicinity of Wampum west to Piney, Menisino and Sundown showed light defoliation. A large swamp in Tp. 2, Rge. 10, E.P. Mer. north of Menisino had light to moderate defoliation and approximately twenty per cent of the tamarack in this area were dead. Light defoliation prevailed north-west of Vassar to Badger, Carrick, Woodridge, Sandilands and north along the west boundary of the Sandilands Forest Reserve to Headquarters. Light to moderate defoliation was recorded in Tp. 7, Rge. 10, E.P. Mer. south of Dawson Cabin. Several small pockets of moderate defoliation occurred between Hadashville and Waugh. Defoliation was light south of Waugh to Harrison Creek. Light to moderate defoliation was recorded between East Braintree and Falcon Lake. Light defoliation occurred south of #4 highway from Seddons Corner to Hazel, Larkhall, Windy Lake, Marchand and La Broquerie. Light to moderate defoliation was recorded in a large tamarack stand south-west of Camp Shilo. This stand known as the west swamp covers a wide area and increment throughout the stand appeared above average. Elsewhere in the Carberry - Douglas area little or no defoliation occurred.

Sequential egg population sampling was carried out in four permanent plots. Egg counts and infestation ratings for 1958 together with the rating for 1957 are shown in Table 1.

Table 1

Population Estimates of the Larch Sawfly
(Based on Oviposition Counts on 5 Sample Trees)

Plot No.	Place	Sec.	Tp.	Rge.	Mer.	Total shoots examined	No. of curled shoots	Infestation rating 1957	Infestation rating 1958
101	Sandilands F.R.	31	7	10	E.P.	60	1	L	L
102	Sandilands F.R.	5	8	10	E.P.	60	1	L	L
103	Sandilands F.R.	32	7	11	E.P.	60	1	L	L
104	Sandilands F.R.	2	8	11	E.P.	70	2	L	L

2.3.2 Spruce Budworm, Choristoneura fumiferana (Clem.)

A general decline in the populations of this species occurred throughout most of southeastern Manitoba (Fig. 5). A major factor for this drop in populations was severe winter drying of balsam-fir and white spruce foliage aggravated by severe frosts during a period of early bud development, which greatly reduced shoot growth. In a number of areas no current shoots were produced until the latter part of June and even then the new foliage was very sparse and could not support a high budworm population. Spruce and balsam-fir stands between East Braintree and Falcon Lake harboured light populations and in all instances defoliation ranged from only a trace to light. In the Moose Lake area south to Sprague populations were very low and little or no defoliation was recorded.

Severe frosts in late April killed a high percentage of jack-pine terminals normally required during early development stages of the jack-pine budworm.

A special survey of plantations in the Carberry and Camp Shilo areas was carried out during the first week of July. Fifty trees were selected in a diagonal line through each plantation to determine the degree of budworm defoliation, degree of staminate flowering and amount of winter drying on individual trees. The following table summarizes the data compiled on the three tree species. It shows light staminate flower production, very light jack-pine budworm defoliation and no significant winter drying.

Table 2

Records of Staminate Flower Production and Defoliation of Pine Plantations in the Camp Hughs Block Spruce Woods Forest Reserve, Manitoba 1956-57-58

Plantation No.	Tree species	Staminate Flower and Defoliation Record						Winter drying* record
		1956		1957		1958		
		Flowering	Defol	Flowering	Defol	Flowering	Defol	
10-30	jP	M	L	L	L	L	L	V.L.
9-30	jP	M	L	L	L	L	L	V.L.
11-30	LP	L	L	L	L	L	L	V.L.
99-26	scP	L	L	L	L	L	L	V.L.
98-25	scP	L	L	L	L	L	L	V.L.
87-25	scP	L	L	L	L	L	L	V.L.
86-25	scP	M	M	M	M	L	L	V.L.
85-25	jP	L	L	M	L	L	L	V.L.
84-25	scP	M	M	M	H	L	L	V.L.
83-25	scP	M	H	M	H	L	L	V.L.
8-30	scP	H	H	M	H	L	L	V.L.
3-30	jP	L	L	L	L	L	L	V.L.
4-30	scP	L	M	M	M	L	L	V.L.
5-30	LP	L	M	L	H	L	L	V.L.
6-30	jP	L	M	L	M	L	L	V.L.
81-25	scP	L	L	M	M	L	L	V.L.
82-25	LP	L	L	L	L	trees dead infested with bark beetles		
7-30	jP	M	L	L	L	L	L	V.L.
1-30	jP	M	L	M	L	L	L	V.L.
2-05	scP	M	L	L	M	L	L	V.L.
79-25	scP	L	L	M	M	L	L	V.L.
3-06	scP	L	L	M	M	M	L	V.L.
4-07	scP	M	L	M	M	M	L	V.L.
80-25	scP	L	L	L	L	L	L	V.L.
2-30	jP	L	L	L	M	L	L	V.L.
2-27	scP	L	L	M	M	L	L	V.L.
56-24	jP	M	L	L	L	L	L	V.L.
57-24	jP	L	L	L	L	L	L	V.L.
58-24	jP	L	L	L	L	L	L	V.L.
40-22	LP	L	L	L	L	L	L	V.L.

* Little or no winter drying was classified as very light (V.L.) in these tables.

Table 3

Records of Staminate Flower Production and Defoliation of Pine Plantations in the Camp Shilo Block Spruce Woods Forest Reserve 1956-57-58

Plantation No.	Tree species	Staminate Flower and Defoliation Record						Winter drying* record
		1956		1957		1958		
		Flowering	Defol	Flowering	Defol	Flowering	Defol	
1-32	lP	L	L	L	L	L	L	V.L.
2-32	scP	M	M	M	M	L	L	V.L.
3-32	scP	M	H	M	H	L	L	V.L.
14-17	jP	L	L	L	L	L	L	V.L.
26-20	scP	L	L	M	H	L	L	V.L.
8-39	jP	L	L	L	L	L	L	V.L.
5-44	lP	L	L	L	L	L	L	V.L.
3-33	lP	L	L	L	L	L	L	V.L.
4-33	jP	L	M	L	M	L	L	V.L.
5-33	jP	L	L	L	L	L	L	V.L.
6-33	jP	L	L	L	L	L	L	V.L.
7-33	jP	L	L	L	L	L	L	V.L.
20-18	jP	L	L	M	H	L	L	V.L.
13-33	jP	L	L	L	L	L	L	V.L.
22-18	jP	L	L	L	L	L	L	V.L.
21-18	jP	M	M	M	M	L	L	V.L.
19-18	jP	M	L	L	L	L	L	V.L.
16-17	jP	L	L	L	L	L	L	V.L.
17-17	jP	L	L	L	L	L	L	V.L.
6-32	jP	L	L	L	L	L	L	V.L.
23-18	jP	L	L	L	L	L	L	V.L.
12-16	scP	L	L	L	M	L	L	V.L.
8-16	scP	M	L	L	M	L to M	L	V.L.
7-16	jP	M	L	L	M	L	L	V.L.
10-16	jP	H	H	M	M	L	L	V.L.
11-16	jP	H	H	M	M	L	L	V.L.
2-33	lP	L	M	L	L	L	L	M
1-33	lP	M	L	L	L	L	L	V.L.
9-16	lP	M	M	L	H	Plantation dead cut out 1958		

* Little or no winter drying was classified as very light (V.L.) in these tables.

Tree mortality counts in Scots pine plantations were carried out during the first week of September in the Spruce Woods Forest Reserve. A line count method was used to determine tree mortality. One-hundred trees were selected diagonally through each plantation. Each tree was marked and classified as healthy, dead, 1/3 crown dead, or dying leaders. Plantations that had been moderate to severely defoliated by the jack-pine budworm for the past two years have begun to show a considerable amount of mortality.

Dead leaders, crowns and completely killed trees were commonly found in the 25 to 30 year old plantations. In the older plantations, trees have apparently been able to withstand the light to moderate defoliation which occurred during the 1956-57 infestation.

Table 4

Tree Mortality of Scots Pine Based on Line Counts of 100 Trees in each Plantation Spruce Woods Forest Reserve 1958

Plantation No.	Date planted	Acreage	Defoliation history 1956	1957	1958	Per cent dead trees in tally 1958	Per cent of trees with 1/3 or less of crown bare or dying	Per cent of trees with leaders bare or dying
87	'25	5.5	L	L	L	0	13	7
86	'25	1	M	M	L	0	11	6
84	'25	4.2	M	H	L	31	55	12
83	'25	1.3	H	H	L	9	65	12
8	'30	45	H	H	L	8	90	19
4	'30	10.3	M	H	L	3	30	17
81	'25	10	L	M	L	2	14	12
2	'05	4.4	L	M	L	4	13	10
79	'25	2	L	M	L	4	34	18
3	'06	8.7	L	M	L	3	31	10
4	'07	9.5	L	M	L	0	11	9
8	'25	5	L	L	L	0	0	5
2	'27	15	L	M	L	10	27	22
2	'32	29.8	M	M	L	0	50	31
3	'32	14.7	H	H	L	0	46	39
26	'20	3.5	L	H	L	0	33	11
12	'16	7.6	L	M	L	2	12	9
8	'16	9.8	L	M	L	0	20	16

2.3.4 Pine Root Collar Weevil, Hylobius radicis Buch.

Special surveys for the distribution and abundance of this insect were conducted in pine plantations in the Sandilands Forest Reserve during September. Survey procedures were modified in order to determine the rate of spread of the infestation outside of areas that have had high populations for the past four years. Plantations within a five mile radius of known infested plantations were examined for the prevalence of this species. Five tree sample stations were established in each plantation and the root collar of each tree was examined for damage. Approximately ninety per cent of the plantations examined were infested in varying degrees. Scots pine appeared the most susceptible species and in a number of instances green trees showing no external damage were infested around the root collar region. The results of this survey are shown in the following table.

Table 5

Summary of Pine Plantations Showing Number of Infested and Dead Trees Sandilands Forest Reserve 1958

Tree species	Plot No.	Acreage	Sampling station no.	No. trees examined	No. trees infested	No. trees dead
Scots pine	2-46	15.9	1	5	2	0
			2	5	4	1
			3	5	5	1
Scots pine	3-48	35.0	1	5	1	0
			2	5	3	1
			3	5	3	1
			4	5	2	0
			5	5	2	0
Scots pine	2-48	35.0	1	5	1	1
			2	5	1	0
			3	5	2	0
			4	5	3	0
			5	5	0	0
Red pine	1-38	22.1	1	5	0	0
			2	5	1	0
			3	5	0	0
			4	5	0	0
Red pine	2-39	3.7	1	5	0	0
Red pine	1-39	8.1	1	5	0	0
			2	5	0	0
			3	5	0	0
Scots pine	1-39	15.0	1	5	5	2
			2	5	5	1
			3	5	5	3
Scots pine	1-49	35.0	1	5	0	0
			2	5	2	1
			3	5	1	0
			4	5	1	0
			5	5	2	0

2.3.5 American Poplar Beetle, Gonioctena americana (Schaeff.)

A number of collections of this insect were made in southern Manitoba. However, with the exception of one area, populations were light and scattered over a large area. The one area in question, located in the north end of the Sandilands Forest Reserve suffered moderate defoliation. Aspen in the locale between Richer and Hadashville occurs in scattered bluffs. Collections were also made at McMunn, East Braintree, Falcon Lake, Marchand, Woodridge, Menisino, Piney, Sprague, Turtle Mountain and Spruce Woods Forest Reserve.

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

Willow stands in the north-east part of the Sandilands Forest Reserve were heavily skeletonized. Browning of foliage was common between Dawson Cabin and Hadashville. Southeast of Hadashville in the Dawson Ridge area defoliation ranged from light to moderate on scattered willow (Fig. 4).

Patches of willow from Hadashville to McMunn suffered light to moderate damage. Light feeding by this insect was recorded between Richer and the west boundary of the Sandilands Forest Reserve and in the area east of Marchand to Woodridge. Elsewhere throughout the southern district populations were light and widely scattered.

2.3.7 The Large Aspen Tortrix, Archips conflictana (Wlk.)

Light populations of the large aspen tortrix were widely distributed through southern Manitoba (Fig. 3). Samples of a very light aspen tortrix population were taken south of Brandon in the Turtle Mountain Forest Reserve. Light populations of this insect infested scattered groves of trembling aspen from Virden west to the Manitoba border. Qualitative sampling was carried out in the Spruce Woods Forest Reserve to determine aspen tortrix populations. In each instance, from two to four aspen tortrix larvae were collected per sample. Two small collections of this insect were made in the area between East Braintree and Falcon Lake. In both instances populations were very light.

2.3.8 Fall Cankerworm, Alsophila pometaria (Harr.)

One collection of this species was made at Portage La Prairie. Populations in this area completely subsided in 1958, which halted any further studies that had been planned for this region. West of Portage La Prairie to the Manitoba - Saskatchewan boundary populations were generally light. Light scattered defoliation of elm and Manitoba maple was recorded in Winnipeg and the immediate surrounding areas.

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

No significant change in the distribution and intensity of this insect occurred in southeastern Manitoba. Larvae were collected from a somewhat wider area but in all instances defoliation remained light. Collections were made from both white and black spruce in the Sandilands Forest Reserve and at Moose Lake as well as from planted white spruce at Elma, Hadashville, McMunn and East Braintree. Light populations were recorded in the Spruce Woods Forest Reserve.

2.3.10 White-pine Weevil, Pissodes strobi Peck.

Widely scattered collections of this insect were made from young jack-pine throughout southeastern Manitoba. With the exception of one area, damage was classed as light. A large jack-pine plantation in the Red Pine Reserve east of Piney located in Sec. 23, Tp. 1, Rge. 12, E.P. Mer. had between 25 and 30 per cent of leaders infested. Trees in this plantation range from 5 to 8 feet in height. One collection of this insect was taken from a small white pine tree near Moose Lake.

2.3.11 Pine Tortoise Scale, Toumeyella numismaticum (Pett. & McD.)

A slight increase in the distribution and abundance of this insect was recorded in the northern and central parts of the Sandilands Forest Reserve. Jack-pine in several areas, where scale has been most prevalent for a number of years, is now showing the effects of prolonged attacks. A number of trees in the infested regions are covered with a conspicuous sooty fungus resulting in stunted needle growth as well as a general unhealthy appearance. The lady beetle, Hyperaspis binotata, was present in a number of areas but populations did not appear high enough to have any direct control. The ant population was also low and did not have any effect on the secretion of honey-dew by the scales. Several Scots pine plantations in the Sandilands Forest Reserve were lightly infested with this insect.

2.3.12 Webworm on Poplar, Tetralopha asperatella Clem.

A sharp decline in populations of this insect occurred in southeast Manitoba. Damage was confined to small scattered aspen in the northern portion of the Sandilands Forest Reserve and south of Hadashville along the Dawson Ridge. Conspicuous damage was recorded south of Carberry and from Brandon south to the International Peace Gardens.

2.3.13 Spotless Fall Webworm, Hyphantria cunea Harr.

This insect was generally distributed through southern Manitoba. Although populations were relatively high in several areas, overall damage was light. An occassional tree showed light to moderate feeding damage. This insect was collected from the following hosts, namely: alder, chokecherry, willow, elm, aspen, dogwood and birch.

2.3.14 Pine Needle Scale, Phenacaspis pinifoliae (Fitch.)

Extensive surveys carried out for this insect revealed that heavy populations were present on white spruce in a number of areas in the city of Winnipeg. The largest and heaviest outbreak occurred in Assiniboine Park. The Winnipeg Board of Parks carried out a series of spraying operations in an effort to control populations. White spruce on private property throughout the city and suburban areas was also heavily infested. In a number of instances Spruce Spider Mite, Paratetranychus ununguis (Jac.) was found in conjunction with Pine Needle Scale.

2.3.15 Spittle Bug, Aphrophora permutata (Say.)

This insect was generally distributed throughout the Sandilands Forest Reserve. The heaviest populations were recorded south of Headquarters in Tp. 5, Rge. 9, E.P. Mer. It is easily recognized by the white frothy masses, which in many instances were found on all of the branches of several young jack-pine examined. As many as fifty masses were counted on a six foot tree.

2.3.16 A Leaf Beetle, Chrysomela tremulae Auct.

This insect was collected from aspen and alder over a wide area in southern Manitoba. In the southeast part of the district it was commonly found on alder along the Dawson trail in the Sandilands Forest Reserve between Brokenhead and Hadashville, north to Elma and along highway #15 to Hazel. Although populations appeared relatively high, defoliation ranged from only light to moderate.

In southwestern Manitoba aspen stands were severely skeletonized in the Oak Lake, Rivers, and Virden areas. The infestation continued from Brandon, east to Austin and south to the Spruce Woods Forest Reserve. In this area a high percentage of the skeletonized aspen foliage had turned a reddish brown by mid August. Light to moderate leaf beetle skeletonization was quite noticeable from Cypress River east to Graysville and Carman.

2.3.17 Boxelder Twig Borer, Proteoteras willingana (Kft.)

Surveys to determine the abundance of this insect have been conducted in farm shelterbelts and parkland areas for the past two years. All stands of Manitoba maple examined were infested with twig borers to some degree. The old and new scars caused by larvae boring in twigs were quite noticeable. Eight areas were selected for population counts. In each area, five representative trees were sampled at three crown levels for twig borer damage. The average percentage of infested twigs was used as a population index. The following summarizes twig borer count records for the past three years.

Table 6

Results of Special Sampling of Boxelder Twig Borer Populations in Southern Manitoba

Place	Location Sec. Tp. Rge. Mer.	No. of twig clusters	No. of twigs infested	Percentage of twigs infested		
			1958	1956	1957	1958
Turtle Mountain Forest Reserve	3 1 20 W.P.	1590	52	23.1	7.5	3.5
Souris	3 8 22 W.P.	1882	31	11.7	7.7	1.6
Camp Hughs	35 10 16 W.P.	1543	75	9.5	7.7	4.8
Ninette	13 5 17 W.P.	1386	39	11.3	8.1	2.8
Holland	29 7 11 W.P.	1351	43	13	9.1	3.2
Wawanesa	24 7 17 W.P.	1608	33	--	7.4	2
Sidney	17 11 12 W.P.	1713	50	--	8.2	3
Poplar Point	11 12 5 W.P.	1113	93	16.4	8.3	8.3

2.3.18 Cottony Maple Scale, Pulvinaria innumerabilis (Rathv.)

Large numbers of this insect were recorded throughout Greater Winnipeg. It appears as white woolly masses on the underside of the smaller branches of Manitoba maple. Premature browning of foliage occurred to the more heavily infested trees. Sustained heavy attacks for two or more years could conceivably cause some branch mortality.

2.3.19 Ugly Nest Tortrix, Archips cerasivorana Fitch.

Nests of this species was commonly found on chokecherry, saskatoon and other roadside shrubs throughout southern Manitoba.

2.3.20 Owlet Moth, Nycteola frigidana

This insect was commonly found on balsam popular through the northern portion of the Sandilands Forest Reserve from Dawson Cabin to Hadashville and east to McMunn and East Braintree. The damage, which was light with patches of moderate, appears as loosely curled leaves, with skeletonizing occurring on the upper surface of the leaf. After prolonged feeding, the foliage turns brown and dries out.

2.3.21 Sawflies of Deciduous Trees

Several different species of sawflies were collected from deciduous hosts in 1968 throughout southeastern Manitoba. However, populations were low and little or no feeding was observed. The following table lists sawfly species collected.

Table 7

Summary of Sawfly Collections from Deciduous Hosts

Species	Host	Remarks
Nematus (Pternidea) sp.	Aspen	Causing light defoliation in vicinity of Moose Lake.
Nematus unicolor	White birch	Populations low.
Nematus limbatus	Willow	Populations widely scattered in Sandilands Forest Reserve.
Nematus (Pternidea) sp.	Willow	Populations low in southeast Manitoba.
Ne atus pinquidorsum	Alder & birch	Populations very low.
Nematus (Pontania) sp.	Balsam poplar	Very light feeding recorded at Moose Lake.
Amauronematus sp.	Willow	Populations low in Sandilands Forest Reserve.
Rogogaster californica	Hazel	Populations low.
Arge clavicornis	Willow & white birch	Populations low.
Priophorus pallipes	Willow & white birch	Populations low.
Cimbex americana americana	White birch	Populations low throughout southeast Manitoba.
Trichiosoma triangulum	Willow	Populations low.
Tenthredo sp.	Willow	Populations low.

2.3.22 Wood Borers

High populations of the wood borer Cerambycid sp. were recorded in several Scots pine plantations in the Spruce Woods Forest Reserve. Severe defoliation caused by the jack-pine budworm over a number of years has caused some mortality in Scots pine plantations. This is no doubt the cause of the increase in borer populations.

2.3.23 A Root Weevil, Hylobius sp.

A survey for root damage and tree mortality caused by this insect was conducted in conjunction with a survey to determine the incidence of the root rot fungus, Polyporus tomentosus.

This survey was carried out in white spruce stands in three areas in southern Manitoba. The root systems of five living and five dead trees were examined and a damage index appraisal was used for each root. The results of the survey are shown in Table 8.

Table 8

Damage Index Average at Three Study Areas in Southern Manitoba
1958

Location	Average d.b.h.		Average height		Damage index		Average percentage of roots diseased on living trees	Average percentage of diseased roots with insect damage on living trees
	Living	Dead	Living	Dead	Living	Dead		
Falcon Lake	9"	9.1"	62'	59'	.7	.2	2	20
Sandilands F.R.	9.1"	8.8"	61'	59'	.6	.11	4.2	0
Spruce Woods	6.9"	5"	41.4'	30'	.1	.0	0	0

2.3.24 Other Noteworthy Insects

A number of minor insects were collected throughout the district in 1958. The species and number of collections are shown in the following table.

Table 9

Other Noteworthy Insects

Host	No. of collections	Locality	Species	Remarks
Balsam fir	2	Sandilands F.R.	Itonida balsamicola	Light
Aspen	7	Spruce Woods F.R.	Epinotia nisella criddleana	Common in this area
Chokecherry	3	Throughout district	Malacosoma lutescens	Common in this area
Aspen	3	S.E. Manitoba	Tetralopha asperatella	Light
Larch	2	S.E. Manitoba	Semiothisa sexmaculata	Light
Willow	3	S.E. Manitoba	Schizura concinna	Light
Willow	4	S.E. Manitoba	Datana ministra	Light

2.4 TREE DISEASE CONDITIONS

2.4.1 A Blister Rust, Cronartium ribicola

One collection of this disease was recovered from white pine in the vicinity of Moose Lake in southeastern Manitoba. The specimen was taken from a small white pine in a mixed stand of spruce, aspen and jack-pine. Dr. Riley reports that this is the first record of white pine blister rust in Manitoba. Further surveys in adjacent areas failed to produce further samples of this disease.

2.4.2 The White-Pocket Rot, Polyporus tomentosus

Complete studies for this disease were carried out in two areas in southwestern Manitoba in 1958. Two, one acre plots were established in mixed stands; one in the Falcon Lake region and the other in the Sandilands Forest Reserve. Only dominant and codominant dead trees were recorded on the cruise strip. Five dead trees in each plot were chosen and the roots of each tree exposed and examined for this disease. Table 10 shows results obtained and records for a plot established later in the Spruce Woods F.R.

2.4.3 Diseases of Elm, Ceratostomella ulmi

Wider and more extensive surveys for diseases of elm were carried out in southeastern Manitoba in 1958. A number of reports on dying elm were checked for Dutch elm disease but in all instances the existing condition was attributed to other factors. Collections submitted to the Saskatoon Laboratory failed to show any indication that would suggest the presence of this disease.

2.4.4 Mistletoe Brooms on Black Spruce, Arceuthobium pusillum

This disease was common on the majority of black spruce stands examined throughout southeastern Manitoba. A number of brooms were recorded at several points and aerial surveys revealed an increase over previous years.

Table 10

Data Recorded from P. tomentosus Survey
Southern District of Manitoba
1958

Location	Size of plot (acre)	Av. tree height	Av. age of stand	No. of trees examined	No. of patches per acre	No. of groups per acre	No. of single trees per acre	No. of healthy roots	No. of decayed roots	No. of decomposed roots	No. of root samples with Polyporus
S.M. 1 S. 18, tp.8,r.16, E.P.m.	1	65	70	5	1	1	9	30	22	3	4
S.M. 2 S. 8, tp. 10, r. 10, E.P.m.	1	60	60	5	1	2	7	37	2	0	-
Carberry S. 24, tp. 10,r.16, W.P.m.	1	32	50	5	4	2	9	19	10	5	0

2.4.5 Canker of Poplar, Hypoxylon pruinatum

Surveys for the distribution and abundance of this disease showed that most aspen stands throughout the district were light to moderately infected.

2.4.6 Canker and Dieback of Tamarack

Very little change was noted in the extent of distribution of this disease in 1958. However, the area infected in previous years in the northern portion of the Sandilands Forest Reserve showed some light branch mortality.

2.4.7 Frost Damage and Winter Drying

Considerable browning of foliage of evergreens occurred during the first two weeks of May. This conditions was, no doubt, caused by winter drying coupled with low temperature readings during the latter part of April and early May. The most severely affected appeared to be balsam fir, although white spruce was also affected but to a lesser degree. Aspen in several areas also suffered from frost damage which caused sparse foliage production appearing in patches. It is believed that this condition will cause considerable loss in increment growth and some tree mortality in the more severely affected areas.

2.4.8 Other Noteworthy Diseases

Table 11

Host	Locality	Disease	Casual organism	Remarks
Aspen	Sandilands F.R.	White trunk rot	Fomes igniarius	Light
Aspen	Sandilands F.R.	Slash fungus	Polyporus sp.	Light-moderate
Jack-pine	Sandilands F.R.	Globose rust gall	Cronartium sp.	Common
Red pine	Sandilands F.R.	Armillaria root	Armillaria mellea	Light
Black spruce	Moose Lake	Needle rust rot	Chrysomyxa sp.	

2.5 SPECIAL PROJECTS

The following is an outline of the work conducted on special projects in 1957.

2.5.1 Phenological Studies

Phenological studies were continued in the Southern District for the third consecutive year. The same locations were used as in previous years and the four tree species selected wherever possible. Some difficulty was experienced in taking the measurements in 1958 due to frost kill which greatly retarded current shoot growth. In a number of instances no measurement was possible.

2.5.2 Special Collections

A number of special collections were made in 1958 for personnel of the Winnipeg and other laboratories. Records on special collections are shown in Table 12.

Table 12

Summary of Special Collections
Southern District
1958

Type of collection and for whom collected	No. of collections	Time spent collecting (including travel)
Jack-pine budworm larval collection for G. W. Stehr (600)	2	1 day
Jack-pine budworm collecting for J. Heron (1000)	2	2 days
Hyphantria cunea collections for Winnipeg Laboratory	5	2 days
Aphid collection for G. Bradley, Winnipeg	23	3 days
Spruce-budworm larval collection for J. Heron (500)	1	1 day
Jack-pine budworm larval collection for G. Stairs, Sault Ste. Marie (1000)	2	2 days
Jack-pine budworm collection for J. Heron (500)	1	1 day

3. ANNUAL REPORT OF FOREST BIOLOGY RANGERS

EASTERN DISTRICT OF MANITOBA

1958

by

A. E. Campbell and M. R. Pratt

INTERIM REPORT 1958

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

March 1959

3.1 INTRODUCTION

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

Special surveys were conducted in early June to determine the severity and occurrence of winter drying and frost injury on conifers and deciduous trees.

A number of sub-projects and mass collections of insect material were made for personnel at the Winnipeg and other laboratories. Research officers from the Winnipeg Laboratory were assisted in conducting white grub population counts in reforestration study areas in the Agassiz Forest Reserve. This work has been carried out in co-operation with the Manitoba Forest Service.

Aerial surveys involving approximately 42 hours of flying time were conducted during June, July and August. These were designed to show the distribution of the spruce budworm, the large aspen tortrix, and the larch sawfly. Surveys covering about 75 miles along two major watersheds in the Whiteshell Forest Reserve were made by boat. A total of six hundred and fifty-one insect and thirty-three tree disease samples were taken from widely distributed points throughout the district. The assistance and co-operation of the Manitoba Government Air Service, Manitoba Forest Service and private co-operators is gratefully acknowledged.

3.2 REVIEW OF FOREST INSECTS AND TREE DISEASES

The most significant change in the status of forest insects was the near collapse of spruce budworm infestations in eastern Manitoba. Factors contributing to the decline appeared to be a combination of winter drying and frost-killing of spruce and balsam fir foliage caused by abnormal weather conditions in the late winter and early spring of 1958. Populations of the spruce budworm in other parts of the district remain about the same as in 1957.

Except for three localized areas, populations of the larch sawfly were again generally low in most tamarack swamps examined throughout the district. Although the large aspen tortrix infestation subsided from 1957, populations were generally distributed, being more abundant in the vicinity of Pinawa and the Interlake region.

Populations of white grubs in the Agassiz Forest Reserve remain high but damage was less apparent, the reason being that most of the grubs were in pupal or adult stages when they cause little or no damage to the root systems of pine transplants.

Although larval populations of the forest tent caterpillar remained at a low level, collections increased from three to thirteen over 1957.

Surveys for tree diseases revealed no major changes in the status of the more important tree diseases. Special attention was given to the de-

tection of jack pine mistletoe east of Lake Winnipeg, and for Radulum casearium a white trunk rot of trembling aspen. Some needle rust on most conifers examined throughout the district, but damage to foliage was very light.

3.3 INSECT CONDITIONS

3.3.1 Larch Sawfly, Pristiphora erichsonii (Htg.)

The larch sawfly remained generally the same throughout the district as in 1957. Slight increases in numbers were noted in some areas. Moderate sawfly defoliation was confined to three localized areas in the Whiteshell Forest Reserve and in the vicinity of Seddons Corner. Only light sawfly defoliation occurred to the occasional tamarack tree near Washow Bay and Koostatak, and extending to Birch Bay and Gypsumville in the Interlake region.

Severe frost in May resulted in varying degress of frost injury to tamarack needles and shoot growth. In many areas current growth was completely killed. This condition was most conspicuous in tamarack stands near West Hawk Lake and running in a northwesterly direction through Lac du Bonnet, Manigotagan and extending north of Riverton in the Interlake region.

Tamarack stands north of Riverton in the Washow Bay area were lightly defoliated. On September 24 an attempt was made to gather a mass cocoon collection in this area, sixty-five percent of this years larch sawfly cocoons were moused, a total of seventeen sound cocoons were recovered during a one and one-half hour search.

Population sampling of the larch sawfly was continued in five permanent tamarack plots. The infestation at each plot was rated on the basis of the percentage utilization of current shoots for oviposition by adult sawflies. Egg counts and infestation ratings for 1958 together with the infestation ratings for 1957 are shown in Table 1.

Table 1

Population Estimates of the Larch Sawfly
(based on oviposition counts on 5 sample trees)

Plot No.	Place	Sec.	Tp.	Rge.	Mer.	Total shoots examined	No. of curled shoots	Infestation Ratings* 1957	1958
101	Rennie	10	11	13	E.P.	80	3	L	L
102	Rennie	22	10	15	E.P.	90	3	L	L
105	West Hawk Lake	29	9	17	E.P.	60	0	L	L
109	Lac du Bonnet	30	15	12	E.P.	90	4	L	L
110	Seddons Corner	5	13	9	E.P.	70	2	L	L
	Picnic Swamp	14	12	15	E.P.	120	21	-	M
	Betula Lake	7	13	15	E.P.	60	1	-	L

* L - light; M - moderate; S - severe.

3.3.2 Spruce Budworm, Choristoneura fumiferana (Clem.)

The most conspicuous change in the status of the spruce budworm was the collapse of the 1957 infestations east of Lake Winnipeg. The decline of budworm in this area is attributed mainly to the abnormal weather conditions which occurred during late winter and early spring of 1958. These abnormal conditions caused severe reddening of the foliage of many young white spruce and balsam fir. Examinations of affected trees indicated this condition was caused by a combination of winter drying and frost injury. Damage extended over an area of approximately 2000 square miles from Manigotagan and Bissett and south to the Winnipeg River and Whiteshell Forest Reserve. Spruce and balsam fir stands in the Interlake region suffered a lesser degree of damage. The most noticeable discoloration occurred in young white spruce stands in the vicinity of Eriksdale and Mulvihill and on Black and Punk islands in Lake Winnipeg.

Despite the collapse of the spruce budworm in these areas, there was near normal budworm activity in other sections of the district.

Light to moderate defoliation of balsam fir occurred at Family and Moar lakes and small patches of moderate defoliation was observed along several of the main watersheds north of Bissett. Surveys along the Manitoba-Ontario boundary revealed light budworm activity at Artery Lake. Although reduced foliage production of white spruce and balsam fir was evident in most of the old infestation areas at Wallace Lake and Pine Dock, larval populations of the spruce budworm appeared to be fairly high.

Ground and aerial surveys of white spruce and balsam fir stands in the Interlake indicated a noticeable change in the status of the spruce budworm. During the past three years this infestation has continued to increase in size and intensity and has continued to spread in a northwesterly direction.

Owing to abnormal spring weather conditions the new shoot and needle production appeared to be very short in comparison to the previous years growth. This reduction of new shoot growth may have been one of the major factors that contributed to the decline of the spruce budworm infestation in the Interlake.

Light to moderate defoliation was recorded along the west shore of Lake Winnipeg from Riverton north to Beaver Creek. Defoliation increased from moderate to severe from Beaver Creek north to Bull Head and Pine Dock. In this area mass collections of over 4000 4th and 5th instar larvae were easily obtained. A number of small areas of severe defoliation were again recorded on Tamarack and Hecla islands and in the Washow Bay Peninsula northeast of Riverton. Spruce budworm lightly infested spruce and balsam stands as far west as Lake St. George and Kinwow Bay. Southwest of Riverton in the Arborg, Camp Morton and Poplarfield areas the spruce budworm has caused considerable destruction to farm woodlots and native spruce shelterbelts.

Infestation Forecasts for 1959

The infestation forecast based on egg surveys are summarized in Table 2. Also shown are the population records for 1956, 1957 and 1958.

Table 2

Location	Infestation ratings			Population records		
	Infestation forecast for 1958	Actual defoliation in 1958	Infestation forecast for 1959	Calculated no. of egg clusters per 100 sq. ft. of balsam fir foliage		
				1956	1957	1958
Eaglenest Lake	Moderate	Light	Light	415	110	0
Garner Lake	Moderate	Light	Light	233	54	0
Winnipeg River	Severe	Light	Light	801	232	0
Manigotogan Lake	Moderate	Light	Light	831	65	7
Wallace Lake	Moderate	Light	Light	-	149	5
Pine Dock #1	Severe	Moderate to heavy	Moderate	792	265	46
Pine Dock #2	Severe	Moderate	Light	852	298	9
Pine Dock #3	Severe	Light to moderate	Light	207	311	0

From the above counts it is evident that budworm populations declined rapidly during the past two years. Indications are that through the regions surveyed, light to moderate defoliation will be restricted to the Pine Dock area in 1959.

Mass collections of larvae and pupae were made from four points in the infestation areas for parasite and disease studies. The per cent parasitism at each collection point based on larval and pupal rearings is shown in Table 3.

Table 3

Per cent Parasitism of Larvae and Pupae of Spruce Budworm in the Interlake Based on Mass Collections and Rearings

Location	Tree sp.	Grid	Type of Collection		Per cent Parasitism	
			Larvae	Pupae	Total larvae	Total pupae
Pine Dock #1	bF	7-089-283	164	96	14.6	15.5
Pine Dock #2	bF	7-088-284	206	106	11.1	23.9
Pine Dock #3	bF	7-087-278	162	105	12.3	22.8
Winnipeg Beach	wS	7-087-265	163	90	1.9	4.4

The preceeding table shows parasitism was responsible for relatively light larval and pupal mortality in 1958. The major larval parasites in order of abundance were Glypta fumiferana and Actia interrupta. The most common pupal parasite was Itoplectis conquisitor. Relatively few diseased larvae were recovered.

For the past five years severe defoliation of mature and regeneration balsam fir stands in the Pine Dock area has resulted in some tree mortality. In order to record mortality in this area, two permanent plots were established in 1957 and retallied in 1958 (Table 4). In the plot at Biscuit Harbor 85 per cent of the balsam fir had died by October 1958. Five successive years of severe defoliation was no doubt the main factor contributing to the decline of this stand. Four more mortality plots listed in Table 4 were established in 1958 for future mortality studies.

Table 4

Spruce Budworm Mortality Plots
Eastern Manitoba
1958

Plot	Tree sp.	Basal area 1957 Living	Basal area 1957 Dead	Basal area 1958 Living	Basal area 1958 Dead	Percentage of basal area dead 1957	Percentage of basal area dead 1958
Big Bullhead	wS	9.566	.370	7.353	.540	3.86	6.84
sec. 19, tp. 30	bF	4.848	.010	4.791	.00	.24	0.00
rge. 6	tA	2.373	.000	1.867	.845	0.00	30.9
E.P.mer.	bS	.071	.005	.675	.00	6.5	0.00
	wB	.049	.000	.049	.00	0.00	0.00
Biscuit Harbor	bF	8.608	.582	1.104	7.257	6.30	86.7
sec. 22, tp. 30	bS	2.312	.489	2.312	.489	17.4	17.4
rge. 5, E.P.m.	wB	1.546	.000	1.546	0.00	0.00	0.00
Big Bullhead	bF			2.157	0.00		0.00
sec. 19, tp. 30	wS			5.545	.294		5.03
rge. 6	bS			.675	0.00		0.00
E.P.mer.	tA			1.132	0.00		0.00
Beaver Creek	bF			7.070	0.00		0.00
sec. 7, tp. 28	wS			1.385	0.00		0.00
rge. 5	bS			.267	0.00		0.00
E.P.mer.	wB			.294	0.00		0.00
Beaver Creek	bF			9.629	0.00		0.00
sec. 7, tp. 26	wS			.109	0.00		0.00
rge. 4	wB			1.790	0.00		0.00
E.P.mer.	bS			.660	0.00		0.00
Bissett	bF			5.866	0.00		0.00
sec. 19, tp. 23	bS			1.460	0.00		0.00
rge. 16, E.P.m.	wS			1.178	0.00		0.00

3.3.3 Jack-pine Budworm, Choristoneura pinus Free.

The general decrease in numbers of jack-pine budworm continued in the Stead-Belair area. Discoloration of jack-pine foliage which is characteristic of jack-pine budworm feeding was absent and staminate flower production was light to moderate.

In the Interlake region populations remained light except in the vicinity of Rosenburg Tower where a light to moderate infestation prevailed on open grown jack-pine.

3.3.4 Large Aspen Tortrix, Choristoneura conflictana (Wlk.)

Light populations of aspen tortrix were observed on most trembling aspen stands in the Interlake region of Manitoba. Throughout most areas a five tree beating sample would usually yield from five to nine larvae. This light population caused very little defoliation to trembling aspen stands in the district.

After last years moderate to severe infestation a further increase in the distribution and abundance of large aspen tortrix was expected throughout most of the aspen stands in the Interlake region. However the unusual weather conditions experienced during the winter and spring of 1957-1958 had considerable affect in reducing the potentially heavy large aspen tortrix populations. The early warm spring (59°F at Winnipeg on March 29) caused early bud development and larvae of the aspen tortrix to leave their hibernacula in search of food. Severe frosts late in April (7.4°F at Winnipeg on April 29) caused killing of trembling aspen buds and foliage. This was particularly noticeable in the Interlake where undoubtedly a high percentage of the aspen tortrix populations were either killed by late frosts or died of starvation.

Populations of the aspen tortrix were most abundant east of Lac du Bonnet in the Pinawa Channel area. In this region, defoliation was usually confined to regeneration aspen. Elsewhere only the occassional larvae was collected.

3.3.5 Forest Tent Caterpillar, Malacosoma disstria Hbn.

There was a slight increase in the numbers of Malacosoma disstria collected from trembling aspen during the survey season. Five collections were made east of Lake Winnipeg at Family and Moar lakes. Two collections were made at Poplarfield and Pine Dock in the Interlake region. Defoliation in all instances was very light.

3.3.6 Fall Cankerworm, Alsophila pometaria (Harr.)

Populations of this insect were generally low throughout the district in 1958. The heaviest larval concentrations occurred on elm and Manitoba maple in the town of Gimli and the resort areas surrounding Winnipeg Beach. A trace of defoliation occurred on Manitoba maple east of Whitemouth and Ladywood. This same condition existed near Arborg and Rosenburg.

3.3.7 Yellow-headed Spruce Sawfly, Pikonema alaskensis Roh.

Surveys indicated an increase in the abundance and distribution of this insect. This was most noticeable on open growing white spruce in the Whiteshell Forest Reserve near West Hawk Lake and in the vicinity of Red Rose Tower in the Interlake region. Defoliation in these areas ranged from light to moderate and was usually confined to a few trees.

3.3.8 Green-headed Spruce Sawfly, Pikonema dimmockii Cress.

This insect usually associated with the yellow-headed spruce sawfly was generally distributed throughout the district. It was collected in low numbers from white and black spruce but caused no noticeable defoliation.

3.3.9 Midge on Jack-Pine, Retinodiplosis sp.

The small but moderate infestation of this species which occurred north of Stead in 1956 and 1957 has now subsided. An occasional collection was taken from jack-pine near Rosenburg in the Interlake region. Damage in all instances was negligible.

3.3.10 White Pine Weevil, Pissodes strobi (Peck.)

This insect was generally distributed in most jack-pine and spruce stands in 1958. The most noticeable damage to leader growth occurred east of Bissett and at Lone Island Lake. Low populations of this insect were also evident near Rosenburg.

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

The balsam-fir sawfly was common on most balsam fir and black spruce examined east and north of Lake Winnipeg but caused no noticeable defoliation. Thirty-two collections of this insect were made from widely separated points from Norway House and east to the Gods River. In the Interlake region populations were generally low.

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

Moderate to severe skeletonizing of willow foliage was general through most of the Interlake region. From Hnausa north to Beaver Creek were dried out and had turned a reddish brown by the first week in August. These same conditions existed from Poplarfield north to Dallas and from Lundar north to the Fairford River. Populations in the eastern section of the district remained at low levels.

3.3.13 Spotless Fall Webworm, Hyphantria cunea Dru.

Populations of the fall webworm were relatively high in the Interlake region. Heavy concentrations of this insect were observed feeding on a wide variety of hosts, including willow, birch, alder, chokecherry, balsam poplar and river birch. Approximately twenty-five mass collections were forwarded to the Winnipeg Laboratory for recovery of the parasite Compsilura concinnata.

3.3.14 Western Tent Caterpillar, Malacosoma pluviale (Dyar)

This tent caterpillar was most common on road side shrubs in the vicinity of Wallace and Long lakes, east of Lake Winnipeg. Occasional tents were collected from white birch in the Bird River and Point du Bois areas. In most instances damage was confined to only one or two branches of the host tree.

3.3.15 Other Noteworthy Insects

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

Table 5

Insect Species	No. of collection	Remarks and host
Acrobasis betulella	4	Low populations on birch
Archips cerasivorana	10	Lightly scattered throughout the district
Arge pectoralis	3	Populations low on alder and birch
Archips rosaceana	2	Found on deciduous hosts
Acleris variana	3	Occasional larva taken from white spruce
Dioryctria reniculella	2	Populations low on conifers
Ferelia jocosa	2	Populations low
Phytodecta americana	8	Causing no appreciable defoliation
Herculia thymetusalis	3	Commonly found on club-top black spruce
Meroptera pravella	9	Light populations on trembling aspen
Othosia hibisci	9	Causing no damage to deciduous hosts
Petrova albicaptana	4	Commonly found on young jack-pine
Neodiprion virginiana	19	Causing a trace of defoliation on jack-pine
Neodiprion banksiana	6	Population low on jack-pine
Neodiprion nanulus	2	Population low on jack-pine
Neodiprion maurus	8	Population low on jack-pine
Sciaphila duplex	20	Causing no defoliation
Tetralopha asperatella	10	Causing no defoliation

3.4 TREE DISEASE CONDITIONS

3.4.1 White Pocket Rot, Polyporus tomentosus

A survey for white-pocket rot, P. tomentosus, was made throughout white and black spruce stands in the Eastern District of Manitoba. In the areas selected for examination, the root systems of five dominant dead spruce were examined for red stain and white-pocket rot. P. tomentosus occurred in only one area, this specimen was recovered from dead white spruce near West

Hawk Lake. The results of the survey are shown in Table 6.

3.4.2 Dwarf Mistletoe on Black Spruce, Arceuthobium pusillum

A heavy concentration of dwarf mistletoe affected a high percentage of black spruce occurs north of Beaver Creek in tp. 27, 28, 29, rge. 5, E.P. mer. Large brooms have disfigured most of the trees in this stand. This infection extends for approximately 17 miles along the Pine Dock Road. No new occurrence of A. pusillum was recorded in the old infected stands near Grand Beach.

3.4.3 Flammula alnicola

Although close observations were made in most accessible white and black spruce stands to detect this fungus which causes butt decay on white and black spruce, it was not found in the Eastern District. This was probably due to the abnormally dry weather during August and September when the fruiting bodies are most likely to be present.

3.4.4 Radulum Casearium

Samples of this fungus were recovered at several points in the Eastern District. All samples of this fungus were recovered from logs left in the bush and from windthrown trembling aspen. The areas from which this fungus was taken are listed in the following table.

Table 7

Radulum casearium Collection Points
Eastern District of Manitoba
1958

Area	Sec.	Tp.	Rge.	Mer.	Host
Dog Lake		23	9	W.P.	Trembling aspen
Birch Bay		29	12	W.P.	Trembling aspen
Brandon Junction		10	14	W.P.	Trembling aspen
Hnausa		23	4	E.P.	Trembling aspen
Ingolf	1	10	17	E.P.	Trembling aspen
West Hawk Lake	1	10	17	E.P.	Trembling aspen

3.4.5 Hypoxylon Canker, Hypoxylon pruinatum

This canker of trembling aspen is generally distributed throughout the district. Dead tops caused by complete girdling of stems by the cankers were most conspicuous in the agricultural areas of the district.

Table 6

Data Recorded During Survey for Occurrence of White-pocket Rot, P. tomentosus
Eastern Manitoba
1958

	Size of plot (acre)	Av. tree height in stand	Av. age of stand	No. of trees examined	No. of patches per acre	No. of groups per a acre	No. of single trees per acre	No. of healthy roots	No. of decayed roots	No. of decomposed roots	No. of root samples with P. tomentosus	A. mellea	unknown
West Hawk Lake	1	53	65	10	1	0	8	9	23	0	2	-	-
Bird River	1	80	90	10	1	0	10	11	38	0	0	0	0
Beaver Crk. S. 20, tp. 28, r. 5, E.P.m.	1	45	85	5	1	0	2	28	12	0	0	0	0
Red Rose Tower S. 35, tp. 30, r. 1, E.P.m.	1	47	75	5	0	0	10	34	3	0	0	0	0

3.4.6 Armillaria Root Rot, Armillaria mellea

This root rot was found in white spruce stands examined near West Hawk Lake. It was also generally distributed in other white spruce stands examined for P. tomentosus.

3.4.7 Ink Spot on Poplar, Ciborina bifrons

A light infestation of this fungus occurred in small patches on trembling aspen between Lac du Bonnet and Pointe du Bois. There was also a trace of this fungus on aspen in the vicinity of Darwin. In all instances less than fifteen per cent of the foliage was affected.

3.4.8 Mistletoe on Jack-Pine, Arceuthobium americanum

For the fourth consecutive year, intensive surveys were conducted in all accessible areas for the occurrence of A. americanum. Particular attention was given to jack-pine stands in the Whiteshell Forest Reserve and east of Lake Winnipeg, but no trace of this mistletoe was found. Jack-pine supporting one or more brooms caused by A. americanum are common in the old infested areas at Belair and Victoria Beach.

3.4.9 Frost Damage and Winter Drying

Abnormal weather during early spring following an extremely mild winter with only light snowfall resulted in severe damage to most tree species in the district. The "winter drying" was undoubtedly caused by the high temperatures in late May (59°F on March 31). The total precipitation from November 1, 1957 to May 23, 1958 totalled only 3.6 inches in the Winnipeg area. This condition was further aggravated by very low temperatures during the latter part of April and first part of May. Temperatures at Winnipeg ranged from a high of 84°F on April 14 to a low of 7°F on April 29. A low of 30°F was recorded as late as May 22.

Aerial and ground surveys conducted in early June indicated that damage to coniferous and deciduous trees caused by frost and "winter drying" extended over an area of approximately 2000 square miles. There was no difficulty experienced in mapping this condition from the air owing to the pronounced discoloration of the trees affected. The most severe injury occurred in the Manigotogan-Bissett areas and extended south to the Winnipeg River areas. While all conifers were damaged to some degree, balsam fir was most seriously affected. By early June, all the balsam fir foliage had turned brown and appeared dead or dying. Subsequent examinations revealed that some mortality of balsam fir was evident, particularly in the Bissett and Pinawa areas. Damage to deciduous trees was confined mainly to complete loss of the current years leaves. Many of these trees later produced only adventitious leaf growth. In the Interlake, frost damage was particularly evident in aspen stands and caused uneven growth of foliage. Dried out and reddish-coloured spruce and balsam fir was commonly seen throughout the Interlake from Eriksdale north to the Fairford River bridge. The same conditions existed north of Hodgson in the Red Rose Tower area, where many of the smaller balsam fir trees had turned a reddish colour.

The severe winter drying was mainly confined to young spruce and balsam fir with shallow rooting systems which are probably more susceptible to drought. It was also noticed that spruce and balsam fir growing on southern exposures were most severely damaged by drought and late frosts. Very little winter browning of spruce and balsam was noticed along lake shores and stands growing on northern exposure where cold winds had retarded any early spring growth.

3.4.10 Other Noteworthy Tree Diseases

Table 8

Other Noteworthy Tree Diseases
Interlake and Southwest Manitoba
1958

Host	Locality	Disease	Remarks
Jack-pine	Rosenberg Tower	Globose rust galls on stem	Light-moderate
Chokecherry	Rosenberg Tower	Black knot on cherry	Common in this area
Jack-pine	Fairford	Globose rust gall, Peridermium harknessi	Light

3.5 SPECIAL PROJECTS

3.5.1 Phenological Studies

This study was continued in the Eastern District of Manitoba. The same locations, tree species, and marked trees as in 1957 were selected whenever possible in each of five sample stations. First measurements of dominant terminal shoots were taken between the first and second week of June. The selected shoots were remeasured after shoot growth was complete. Other events such as duck migrations, first appearance of flies, flower, etc., were also recorded.

3.5.2 Special Collections

A number of special collections were made throughout the season for personnel of the Winnipeg and other laboratories. The type and purpose of the collections are shown in Table 9.

Table 9

Summary of Special Collections

Type of collection and for whom collected	No. of collections	Time spent collecting (including travel)
Jack-pine budworm larval collection for J. Heron, Winnipeg Laboratory	1	2 days
Spruce budworm collection for J. Heron, Winnipeg Laboratory	3	3 days
Fall webworm mass collections for Winnipeg Laboratory	15	2 days

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

1958

by

K. L. Mortensen

INTERIM REPORT 1958

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

March 1959

4.1 INTRODUCTION

Forest insect and tree disease surveys were carried out in the Southern District of Saskatchewan from May 15 to September 18. A total of 373 insect samples and 10 tree disease samples were collected.

In addition to general sampling a number of special collections and projects were carried out. These included mass collections of spruce budworm and larch sawfly cocoons for appraisal of parasites, diseases and population counts for the fall cankerworm and the boxelder twig borer. A forest tent caterpillar egg survey was conducted through the Cypress Hills Provincial Forest in the fall. Egg band counts were used to forecast the status of this species in 1959. A special study for the occurrence of the fungus, Polyporus tomentosus in white spruce was begun in 1958. The results of these studies are outlined in this report.

4.2 REVIEW OF INSECT AND TREE DISEASE CONDITIONS

The forest tent caterpillar caused severe defoliation of approximately 75 per cent of the aspen stands in the Cypress Hills area. The spruce spider mite was unusually abundant on white spruce shelterbelts and ornamentals throughout the eastern part of the district. Fall cankerworm and yellow-headed spruce sawfly populations declined slightly. Frost damage to trembling aspen and bur oak was severe in eastern Saskatchewan.

4.3 INSECT CONDITIONS

4.3.1 Forest Tent Caterpillar, Malacosoma disstria Hbn.

The forest tent caterpillar was the most serious tree insect pest of southern Saskatchewan in 1958. Distribution and abundance of larvae is shown in Fig. 2.

Severe defoliation was caused to deciduous trees and shrubs over approximately two-thirds of the Cypress Hills Provincial Park, and over approximately three-quarters of the East Block of the Cypress Hills Provincial Forest. The outbreak showed a marked increase over 1957 when only a small patch of light defoliation occurred in the Park along the east side of Loch Lomond. Light populations occurred in the West Block of the Cypress Hills Provincial Forest. This treed area is separated from the Park Block by approximately 6 miles of open rangeland. In 1958 most of the larval feeding was completed by May 30 and the trees had almost completely refoliated by July 15.

A widespread increase in distribution and abundance of the forest tent caterpillar occurred throughout the entire aspen-grove section of the Southern District of Saskatchewan. Sampling of aspen during June showed low populations at most points. A small area of light defoliation was recorded in the vicinity of Duff.

In the Cypress Hills region egg bands of the forest tent caterpillar were found on various shelterbelt tree species. Egg bands were found as far north as Leader, south to Govenlock and east as far as Sidewood and Southfork.

Egg bands were found during surveys of the Maple Creek area in 1957, but no defoliation was recorded at these points in 1958. In shelterbelts at Maple Creek the moths had, in some cases, oviposited on the petioles of the leaves of Manitoba maple. The preferred host for this insect species is aspen and usually the eggs are oviposited on the twigs. Eggs on the petioles would drop at the time of "leaf fall" and chances of hatch and survival of small larvae the following spring would be greatly reduced. This possibly accounts for the absence of feeding damage in the Maple Creek area in 1958. During egg surveys of shelterbelts in the fall of 1958 it was again observed that about 50 per cent of the oviposition on Manitoba maple was on leaf petioles. Egg counts in native aspen of the Cypress Hills Provincial Forest gave evidence of continued high populations, although there was a noticeable decrease in the size of egg bands at some locations. Egg surveys were also carried out during the fall of 1958 throughout the aspen-grove region of the district. The results of egg counts in the Southern District of Saskatchewan are shown in Table 1.

A mass collection of forest tent caterpillar cocoons and larvae was made in the Cypress Hills Provincial Park on June 28. Of 643 pupae reared, 2.8 per cent contained Dipterous parasites and 1.1 per cent contained Hymenopterous parasites; and out of 96 larvae reared, 6.1 per cent contained Dipterous parasites. No Hymenopterous parasites were obtained from larval rearings.

Table 1

Summary of Forest Tent Caterpillar Egg Band Counts
Based on Examination of Three Trembling Aspen Trees

Place	Station number	Location				Average		Av. no. of egg bands	Defol. for 1958*	Forecast for 1959*
		Sec.	Tp.	Rge.	Mer.	d.b.h.	ht.			
Cypress Hills, E. Blk.	1	21	9	25	W.3	3.6	23	64.3	S	S
Cypress Hills, E. Blk.	2	29	9	24	W.3	3.3	25	20.0	M	S
Cypress Hills, E. Blk.	3	24	9	24	W.3	3.3	22	27.0	M	S
Cypress Hills, E. Blk.	4	6	9	24	W.3	3.6	28	12.0	L	S
Cypress Hills, P. Blk.	5	17	8	26	W.3	5.3	46	39.6	S	S
Cypress Hills, P. Blk.	6	13	8	27	W.3	3.6	29	41.6	S	S
Cypress Hills, P. Blk.	7	26	8	27	W.3	3.3	29	50.6	S	S
Cypress Hills, W. Blk.	8	5	8	29	W.3	3.6	28	0.3	N	L
Cypress Hills, W. Blk.	9	30	7	28	W.3	3.6	23	1.6	N	M
Cypress Hills, W. Blk.	10	34	7	30	W.3	3.0	20	0.0	N	N
Cypress Hills, E. Blk.	11	17	9	25	W.3	3.3	25	5.0	L	M
Cypress Hills, E. Blk.	12	25	9	25	W.3	3.6	24	53.6	S	S
Cypress Hills, P. Blk.	13	29	8	26	W.3	3.0	24	19.0	M	S
Maple Creek	14	28	9	26	W.3	3.0	28	5.0	L	M
Cypress Lake	15	25	6	26	W.3	3.0	28	3.3	L	M
Tompkins	16	10	11	21	W.3	3.3	26	1.0	L	L
Bone Creek	17	31	10	20	W.3	3.6	26	0.0	N	N
Southfork	18	34	7	21	W.3	3.3	25	0.3	L	L
Manor	101	1	8	1	W.2	2.6	23	2.3	L	M

Place	Station Number	Location Sec.	Tp.	Rge.	Mer.	Average d.b.h.	ht.	Av. no. of egg bands	Defol. for 1958*	Forecast for 1959*
Moose Mnt. P.F.	102	31	10	3	W.2	6.3	52	0.0	N	N
Kipling	103	27	11	5	W.2	3.3	25	0.0	N	N
Duff	104	21	22	8	W.2	3.0	23	0.0	N	N
Balcarres	105	18	21	10	W.2	3.3	25	0.0	N	N
Wapella	106	10	15	33	W.1	3.0	25	0.3	L	L
Broadview	107	29	16	4	W.2	3.0	[illegible]	0.7	L	L
Lipton	108	34	22	14	W.2	3.0	15	0.0	N	N
Raymore	109	31	25	18	W.2	2.6	15	0.0	N	N
Punnichy	110	3	26	17	W.2	3.0	13	0.0	N	N
Leross	111	2	27A	15	W.2	3.3	26	0.0	N	N
Leross	112	24	25	15	W.2	3.3	26	0.7	L	L
Wolseley	113	25	17	11	W.2	3.0	23	0.0	N	N
Grenfell	114	33	17	7	W.2	3.0	28	1.3	L	L
Lemberg	115	10	20	9	W.2	3.3	25	0.3	L	L
Kallaly	116	18	20	6	W.2	3.0	23	0.0	N	N
Melville	117	30	22	6	W.2	3.0	23	0.0	N	N
Indian Head	118	21	18	13	W.2	2.3	21	0.0	N	N
Balcarres	119	6	22	11	W.2	3.0	21	0.0	N	N
Ituna	120	29	25	11	W.2	3.3	20	0.3	L	L
Jasmin	121	8	26	12	W.2	3.3	21	0.0	N	N
Grenfell	122	32	16	7	W.2	3.3	21	0.0	N	N
Grenfell	123	28	18	7	W.2	3.3	23	0.0	N	N
Grenfell	124	6	18	6	W.2	3.3	21	1.6	L	M
Grenfell	125	35	17	8	W.2	3.0	22	0.0	N	N
Oakshela	126	31	17	5	W.2	3.3	25	0.3	L	L

* N - nil; L - light; M - moderate; S - severe.

4.3.2 Fall Cankerworm, Alsophila pometaria (Harr.)

Populations of the fall cankerworm declined in most areas in 1958. Infestation ratings at collection points in southern Saskatchewan are shown in Fig. 7. The most noteworthy decline in numbers of cankerworm occurred in the Moose Jaw area. The severe infestations reported in the Findlater and ValJean areas in 1957 also subsided. On the other hand the number of infested shelterbelts increased in the Swift Current area. Severe defoliation of farm shelterbelts was recorded at Swift Current, Stewart Valley and Success. A heavy infestation persisted in a shelterbelt on a vacant farmstead at Maple Creek and a moderate infestation was found at Vogel. In the eastern park-belt region the status of this species remained about the same. The infestation at Grenfell remained heavy with almost complete defoliation to Manitoba maple. A heavy infestation was recorded near Melville. A spray control program carried out in 1957 by the city of Yorkton appeared to keep this insect in check and although no defoliation was apparent some larvae were found. The town of Moosomin suffered from an attack by the fall cankerworm. Although spraying was begun considerable defoliation had already resulted. Spraying

was also carried out on the Dominion Experimental Farm at Indian Head, but a number of large elm trees were stripped before controls were applied.

Population counts were again made at a number of permanent sampling stations. Due to declining populations in the Moose Jaw area, studies were carried out in the vicinity of Swift Current. One count was also made at Maple Creek.

The results of the fall cankerworm population are shown in Table 2.

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

Very little change was noted in the status of the yellow-headed spruce sawfly in the Southern District of Saskatchewan. Light to moderate defoliation persisted in spruce plantings in the Kenosee Lake and Duff-Lorlie areas. Light infestations were recorded in spruce shelterbelts in the vicinity of Brock, Rosetown, Hawarden, Elbow, Goodeve and Ituna. As in the past few years, only the occastional larvae were obtained from native white spruce in the Cypress Hills.

4.3.4 Large Aspen Tortrix, Choristoneura conflictana (Wlk.)

Populations of the large aspen tortrix decline considerably from the infestation proportions of 1956 and 1957. Larvae were common in the aspen-grove section of the district but only light patches of defoliation were observed. In most instances the aspen tortrix were associated with the forest tent caterpillar. Distribution and abundance of the large aspen tortrix is shown in Fig. 3.

4.3.5 Spruce Spider Mite, Paratetranychus ununguis (Jac.)

The spruce spider mite was found in the majority of white spruce shelterbelts examined in the Southern District of Saskatchewan. Infestations were much heavier than in previous years through the eastern portion of the district. Heavy infestations were recorded in shelterbelts and ornamentals at Indian Head, Weyburn, QuAppelle, Yorkton and Melville. In the central and western portions of the district populations ranged from light to moderate.

4.3.6 The Mite, Oligonychus poss. ununguis

This mite was very abundant on larch at the Forest Nursery Station, Indian Head. Spraying operations were carried out on June 20 and satisfactory control affected.

4.3.7 Pine Needle Scale, Phenacaspis pinifoliae (Fitch.)

The pine needle scale was found in white spruce shelterbelts over the entire Southern District of Saskatchewan. Populations were generally low with occassional high populations on individual trees within a shelterbelt. Moderate infestations were recorded at Yorkton and Grenfell. Very light populations were found on the native white spruce and lodgepole pine of the Cypress Hills.

Table 2

Results of Special Sampling to Determine Incidence of the Fall Cankerworm on Manitoba Maple Shelterbelts Southern Saskatchewan

Location	Tree No.	No. of leaf clusters examined	No. of leaf clusters containing larvae	Percentage of leaf clusters infested	Average no. of larvae per infested leaf cluster	Defoliation at end of feeding season
Stewart Valley	1	48	34	70.8	1.8	Moderate
	2	48	42	87.5	2.1	Severe
	3	48	46	95.8	5.8	Severe
	4	48	45	93.7	4.7	Severe
	5	48	28	58.3	1.4	Moderate
Totals		240	195			
Success	1	48	47	97.9	10.5	Severe
	2	48	48	100.0	10.0	Severe
	3	48	47	97.9	7.3	Severe
	4	48	48	100.0	5.9	Severe
	5	48	47	97.9	8.0	Severe
Totals		240	237			
Swift Current	1	48	48	100.	12.9	Severe
	2	48	48	100.	9.9	Severe
	3	48	45	93.7	5.9	Severe
	4	48	48	100.	10.6	Severe
	5	48	42	87.5	4.5	Severe
Totals		240	231			
Val Jean	1	48	2	4.1	1.5	Light
	2	48	4	8.3	1.2	Light
	3	48	6	12.6	1.1	Light
	4	48	4	8.3	1.7	Light
	5	48	11	22.9	1.2	Light
Totals		240	27			
Maple Creek	1	48	44	91.6	5.0	Moderate
	2	48	46	95.8	5.3	Moderate
	3	48	46	95.8	5.6	Moderate
	4	48	43	89.6	6.7	Moderate
	5	48	44	91.6	5.3	Moderate
Totals		240	223			

4.3.8 Larch Sawfly, Pristiphora erichsonii (Htg.)

Larch sawfly infestations continued to decline in the three areas where it is known to occur in the Southern District of Saskatchewan (Fig. 1).

Chemical spray control has reduced sawfly populations to a very low level at the Indian Head Forest Nursery Station. A marked decline attributed to natural causes was noted at Wolseley and at the Battle Creek Ranger Station.

A collection of cocoons was made at Wolseley, on August 12, for parasitism studies. The results of the cocoon dissections are shown in Table 3.

Table 3

Summary of Larch Sawfly Parasitism Determined by Dissections

Location	No. of cocoons examined	No. of larch sawfly containing Mesoleius		Percentage effective parasitism based on living larvae			Percentage cocoons diseased
		Eggs	Larvae	B. harveyi	M. tenthredinis	T. klugii	
Wolseley	200	8	2	3.7	2.4	59.5	21

4.3.9 Spruce Budworm, Choristoneura fumiferana (Clem.)

A small, but severe infestation of spruce budworm occurred in the Cypress Hills Provincial Forest. Approximately 75 per cent of the current foliage of white spruce was destroyed over an area of approximately 10 square miles. Some back feeding on old foliage was observed on the more severely defoliated trees. This outbreak has been building up since 1956. The main infestation, which is in the main stand of white spruce, is located in the valley of Battle Creek on the Saskatchewan - Alberta boundary. Infestations favour the valley bottoms and work upward until the white spruce stand is replaced by lodgepole pine.

The spruce need worm, Dioryctria reniculella was found closely associated with the spruce budworm. Larvae of the spruce needle worm were found feeding on the pupae of the spruce budworm.

A mass collection of spruce budworm larvae was made on May 27, and a mass collection of pupae made on July 3 from the Cypress Hills infestation. All species of parasites obtained have not been positively identified. However the results of rearings are broadly summarized in Table 4.

Spruce budworm larvae were found in a number of shelterbelts throughout the agricultural area of the Southern District. Populations continued to decline in the Colorado spruce plantation at the Nursery Station, Indian Head and in the white spruce shelterbelt at Grenfell. Light populations were recorded in shelterbelts in the Cupar - Finnie area.

Table 4

Summary of Spruce Budworm Larval and Pupal Rearings

Location	Number of larvae	Number of pupae	Parasites emerged			
			Dipterous		Hymenopterous	
			Larvae	Pupae	Larvae	Pupae
Cypress Hills P.F.	116	183	16	11	4	10

4.3.10 Boxelder Twig Borer, Proteoteras willingana Kearf.

The boxelder twig borer occurred in nearly all Manitoba maple shelterbelts sampled in the Southern District of Saskatchewan. Populations were generally light and showed some decline from 1957. Larval counts were made in shelterbelts at Maple Creek, Moose Jaw, Findlater, Willowbrook, Swift Current, Indian Head and Carlyle.

The results of these counts are shown in Table 5.

Table 5

Summary of Boxelder Twig Borer Population Studies

Place	Location				Total No. of twigs examined in 1958	No. of infested twigs in 1958	Percentage of twigs infested each year		
	Sec.	Tp.	Rge.	Mer.			1958	1957	1956
Maple Creek	36	11	27	W.3	1124	8	0.7	0.04	8.3
Moose Jaw	33	15	26	W.2	751	33	4.4	13.9	46.1
Findlater	20	21	25	W.2	915	46	5.0	32.8	42.8
Willowbrook	4	26	6	W.2	823	123	14.9	15.5	11.6
Swift Current	6	17	13	W.3	557	10	1.8	5.4	10.0
Indian Head	35	19	13	W.2	541	23	4.2	21.9	12.3
Carlyle	31	5	2	W.2	666	34	5.1	13.4	28.3

4.3.11 Ugly Nest Tortrix, Archips cerasivorana Fitch.

Larvae of the ugly nest tortrix were found throughout the Southern District of Saskatchewan. Heavy infestations were found on the native chokecherry of the Elbow Provincial Forest and along the South Saskatchewan River north of Leader. Populations declined considerably in the Great Sand Hills north of Tompkins. Light infestations were found at Maple Creek, Rosetown and Yellow Grass.

4.3.12 Gray Willow-leaf Beetle, Galerucella decora Say.

A moderate infestation of the gray willow-leaf beetle occurred in the Cypress Hills. Willow in the vicinity of the Birch Creek Ranger Station was approximately 75 per cent skeletonized. Only light populations of this insect occurred through the eastern park-belt section of the Southern District of Saskatchewan. Light skeletonization was observed in the Touchwood Hills south of Punnichy. The infestation ratings at collection points are shown in Fig. 4.

4.3.13 American Poplar Leaf Beetle, Gonioctena americana (Schffr.)

The American poplar leaf beetle occurred abundantly throughout the Cypress Hills. Larvae were common by May 21, while the first adults were collected May 22. Elsewhere throughout the district only the occassional larva and adult was found.

4.3.14 Webworms, Meroptera pravella and Tetralopha asperatella

Larvae of these webworms were very numerous in the Cypress Hills area. The habit of the webworm is to form a small "nest" of webbing and aspen leaves. The forest tent caterpillar cocoons appear to provide a ready-made nest, which possibly encourage the increase of webworm populations. Light defoliation of aspen became noticeable during the latter part of August. The pattern of defoliation corresponded to the abundance of forest tent caterpillar cocoons. These were concentrated at the periphery of the heavy forest tent caterpillar defoliation.

Throughout the aspen-grove section of the district only an occassional webworm larva was collected.

4.3.15 Other Noteworthy Insects

The insect species listed in Table 6 occurred commonly throughout the district but caused little or no defoliation.

Table 6

Other Noteworthy Insects

Insect species	No. of samples	Remarks
Epinotia nisella criddleana	24	Common on aspen throughout district.
Olene vagans	19	Common on aspen throughout district.
Oporophtera bruceata	17	Common on aspen throughout district.
Neodiprion nanulus contortae	10	Common on 1P in Cypress Hills
Zale duplicata largera	7	Common on 1P in Cypress Hills
Petrova albicapitana	6	Light on 1P in Cypress Hills
Lecanium corni	5	Moderate on elm at Regina and Indian Head.

Insect species	No. of samples	Remarks
Eriosoma americana	4	Light on elm throughout district
Chermes cooleyi	3	Common on wS in Cypress Hills
Recurvaria sp.	3	Found occassionally on 1P in Cypress Hills.
Argyrotaenia pinatubana	2	Found occassionally on 1P in Cypress Hills.
Bucculatrix canadensisella	2	Light on the few birch stands in district.
Acleris variana	3	Found occassionally on wS.
Hyalophora cecropia	1	Found at Fox Valley
Malacosoma lutescens	3	Scattered throughout district.

4.4 TREE DISEASE CONDITIONS

Tree disease conditions remained very much the same as in 1957 throughout the Southern District of Saskatchewan.

Ten tree disease samples were submitted to the Forest Pathology Laboratory at Saskatoon for identification.

4.4.1 Frost Damage to Forest and Shelterbelt Trees

Frost damage was severe over much of the eastern part of the district. Low temperatures recorded on May 22 at Broadview and Indian Head were 19°F and 26°F respectively. Again on June 12 low temperatures were at Broadview 24°F and Indian Head 29°F, and on June 13 at Broadview 29°F and Indian Head 30°F. Trembling aspen appeared to be the most severely damaged by the May 22 frost.

Bur oak was severely damaged by both frosts. Patches of varying degrees of frost damage were to be seen throughout the entire parkbelt region. The most extensive area of damage was along the Saskatchewan - Manitoba boundary roughly from Moosomin to Langenburg. Damage was characterized by blackening of the leaders of the upper crown to complete absence of foliage excepting a few abnormal leaves.

4.4.2 The White-Pocket Rot, Polyporus tomentosus

A survey for the occurrence of white-pocket rot, Polyporus tomentosus was conducted in the Cypress Hills Provincial Forest. Within a plot 1 chain x 10 chains all dead white spruce were tallied and the root systems of 5 dead trees were examined. Nine root samples from the study plot were sent to Saskatoon for identification. Four roots contained white-pocket rot, Polyporus tomentosus and eight roots contained yellow stringy rot, Armillaria mellea. A summary of the data obtained from this survey is shown in Table 7.

Table 7

Data Recorded from P. tomentosus Survey
Southern District of Saskatchewan - 1958

Location	Size of plot (acre)	Av. age of stand	No. of trees examined	No. of patches per acre	No. of groups per acre	No. of single trees per acre	No. of healthy roots	No. of decayed roots	No. of decomposed roots	No. of samples with P. tomentosus	No. of samples with A. mellea
S.S. 1 Sec. 1, tp. 8, rge. 29 W.3	1	75	5	30	0	40	14	11	0	4	8

4.4.3 Cankers of Aspen

Hypoxylon canker is general throughout all aspen stands in the district. The false tinder fungus, Fomes igniarius, the cause of canker and white trunk rot, is commonly found in the more mature aspen stands, i.e. Moose Mountain and Cypress Hills Provincial Forests.

4.4.4 The Globose Rust Gall, Cronartium sp.

This rust gall is common on lodgepole pine in the Cypress Hills Provincial Forest. A very light infection of a needle cast on lodgepole pine was also recorded.

4.4.5 Canker of Lodgepole Pine

A considerable number of lodgepole pine were observed to be infected with a stem canker. The canker resembles a wound with an abundance of resin flow. A sample of this canker was submitted to Saskatoon but the fruiting bodies were too old to be identified.

4.4.6 Other Noteworthy Diseases

Table 8

Other Noteworthy Diseases
Southern District of Saskatchewan
1958

Disease Agents	Host	Location	Remarks
Cytospora sp.	Willow	Radville	Cytospora canker occurring in shelterbelt.
Tuberoularia sp.	Willow	Radville	Die-back occurring in shelterbelt.
Cytospora chrysosperma	Poplar	Radville	Cytospora canker occurring in shelterbelt.
Polyporus hirsutus	T. aspen	Grenfell	Slash fungus.
Polyporus pargamenus	T. aspen	Last Mountain	Slash fungus.

4.5 SPECIAL PROJECTS

Permanent Sample Plots and Stations

The following table shows the number of insect samples of the more common species obtained from permanent sample stations using the 5 tree beating sampling method.

Table 9

Collection of Major Insect Species from Permanent Sample Plots and Stations in 1958 Southern District of Saskatchewan

Insect Species	No. of plots or stations	Sample numbers	No. of samples containing larvae	Av. no. of larvae per tree
Pikonema alaskensis	3	W 1954 W 2941	2	0.6
Pikonema dommockii	3	W 1954	1	0.4
Choristoneura conflictana	3	W 0283	1	1.4
Epinotia nisella criddleana	3	W 0108	1	3.0
Alsophila pometaria	4	W 0100	1	1.2

4.5.1 Phenological Studies

Phenological studies were continued in the Southern District of Saskatchewan in 1958. Shoot growth measurements were taken from aspen and white spruce stations in the district. The first measurements were made between June 4 and 9 when growth was determined to be 50 per cent complete. Second and final measurements were taken in the fall when growth had terminated. Study areas were located at Moose Mountain Provincial Park, Wolseley, Indian Head, Moose Jaw, Swift Current and Cypress Hills Provincial Park.

4.5.2 Special Collections

The following table provides information on special collections made during 1958 in the Southern District of Saskatchewan.

Table 10

Summary of Special Collections

Location	Type of collection	Collected for
Cypress Hills P.F.	Forest tent caterpillar egg bands.	Forest tent caterpillar studies - R. M. Prentice Winnipeg Laboratory.
Cypress Hills P.F. Wood Mountain Regina	White spruce and trembling aspen tree discs and increment cores.	Forest tent caterpillar studies - V. Hildahl Winnipeg Laboratory.
Wolseley	Larch sawfly cocoons	Predation studies - V. Hildahl, Winnipeg Lab.

5. ANNUAL REPORT OF FOREST BIOLOGY RANGER

WESTERN DISTRICT OF MANITOBA

1958

by

J. J. Lawrence

INTERIM REPORT 1958

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

March 1959

5.1 INTRODUCTION

Field surveys were carried out from May 15 to September 30 to determine the status and distribution of forest insects and tree diseases in the Western District of Manitoba. Surveys in the northern part of the district, from Swan River to the Overflowing River, were carried out by J. B. Martin and are outlined in this report.

Five flying hours were used for aerial surveys and mapping the large aspen tortrix infestations. Special projects included: (1) sequential sampling of larch sawfly eggs for population estimates; (2) distribution of larval drop trays in two widely separated swamps for larch sawfly parasite studies; (3) a survey for the distribution of the white pocket rot, Polyporus tomentosus in conjunction with a Hylobius sp. damage assessment; (4) a phenological survey; (5) a forest tent caterpillar egg band survey; and (6) mass collections and special collections of various species of sawflies and aphids. Co-operation given by the Manitoba Forest Service, National Parks personnel and private co-operators is gratefully acknowledged.

5.2 REVIEW OF FOREST INSECT AND TREE DISEASES

A slight increase in the larch sawfly populations was evident in some areas of the Duck Mountain Forest Reserve and in the vicinity of Cowan. Throughout the remainder of the district, the status remained at the same low level as in the previous year. Late spring frosts caused severe damage to the new shoots of tamarack in Riding Mountain National Park and patchy damage in the Cowan area. In many instances shoot growth was limited to the upper third of the crown.

Collections of the spruce budworm were more widespread but populations remained low. Frost damage was severe on white spruce in the Park area. At many locations white spruce produced little or no current growth.

There were marked changes in the distribution of the large aspen tortrix. The infestation between Clear Lake and Lake Manitoba terminated. This may have been due to severe frost damage to aspen foliage which killed about 75 per cent of the new leaves. Refoliation was almost complete by July 1. The infestation west of Clear Lake extended westward from Gunn Lake almost to the Manitoba - Saskatchewan boundary. The boundaries of the infestation north and west of Grandview extended westward to cover approximately 500 square miles. Low populations of the forest tent caterpillar were present in most aspen stands examined in the area bounded by Clear Lake and Russel on the south and Roblin and Dauphin on the north. Severe defoliation by the yellow-headed spruce sawfly was confined to widespread shelterbelts throughout the agricultural portion of the district. In forested areas little or no defoliation by this species was noted.

Needle rusts of spruce and jack-pine were very light throughout the entire district. Evidence of P. tomentosus was found at two locations, one in Riding Mountain National Park and the other in the Duck Mountain Forest Reserve.

5.3 FOREST INSECT CONDITIONS

5.3.1 Larch Sawfly, Pristiphora erichsonii (Htg.)

Populations of the larch sawfly showed a slight increase over the previous year in widely separated areas in the Duck Mountain Forest Reserve and in the vicinity of Cowan. Moderate defoliation was recorded at Glad Lake, Singoosh Lake and 17 miles north of Grandview. Other areas of moderate defoliation on tamarack reproduction were (1) 4 miles northwest of Audy Lake, (2) 8 miles west of Onanole and (3) 12 miles north of Meadow Portage. Throughout the remainder of the district defoliation was light.

Infestation ratings at various points in the district are shown in Fig. 1.

During the first part of July two tamarack stands were selected, one in Riding Mountain National Park and the other near Cowan. At each location 20 larval drop trays were set out under the canopy of tamarack trees showing some defoliation. Cocoons were collected after larval drop period and dissected in the laboratory for estimates of parasites and disease. The cocoon counts and dissection data are shown in Table 1.

Dissection results indicate Bessa harveyi is still the major parasite of the larch sawfly. Effective parasitism by Mesoleius tenthredinis never exceeded 2 per cent. About 80 per cent of the parasite eggs of this species failed to hatch due to encapsulation.

Sequential sampling of larch sawfly was carried out in three permanent sample plots. One near Cowan, another in Riding Mountain National Park and the third at Mafeking. Infestation ratings were based on the proportion of current shoots utilized for oviposition by adult sawflies. Results of the sampling are shown in Table 2.

Table 2

Infestation Rating of the Larch Sawfly
Western Manitoba 1958

Plot No.	Place	Total shoots counted	No. of curled shoots	Infestation rating
108	Riding Mountain National Park Sec. 36, tp. 19, rge. 17, W.P.	229	4	light
111	Cowan Sec. 15, tp. 36, rge. 23, W.P.	993	16	light
112	Mafeking Sec. 3, tp. 46, rge. 25, W.P.	50	0	light

Table 1

Cocoon Counts and Dissection of Larch Sawfly from 20 Larval Drop Trays at two Areas in Western Manitoba 1958

Plot no.	Location	No. of trays	No. of cocoons collected	Av. no. cocoons per tray	No. of cocoons destroyed by small mammals	No. of cocoons destroyed by fall Bessa emergence	No. of cocoons examined	No. of sawfly larvae containing Mesoleius egg	No. of sawfly larvae containing Mesoleius larva	Per cent effective parasitism based on sound larvae B. harveyi	Per cent effective parasitism based on sound larvae M. tenthredinis	Per cent effective parasitism based on sound larvae T. klugii	Per cent larvae diseased
108	R.M.N.P.	20	341	17	41	30	200	16	3	22	2	0	6
111	Cowan	20	1203	60	103	12	200	14	3	22	2	0	4

5.3.2 Large Aspen Tortrix, Choristoneura conflictana (Wlk.)

A decrease in the activity of this insect east of Riding Mountain National Park to Lake Manitoba was evident this past season. The infestation in this area almost terminated. West of Clear Lake defoliation was generally moderate with widely scattered pockets of severe. Intensity of the infestation in the Duck Mountain Forest Reserve remains about the same as in the previous year but increased notably in size. Severe frost occurred throughout the aspen grove region east of the Park. Most suffered complete loss of foliage but had refoliated again by July. Moderate frost damage was recorded in the Park and west to Russell. In the Duck Mountain Forest Reserve frost damage was light and very scattered. Observations in Riding Mountain National Park indicated that many large aspen tortrix larvae had left their hibernacula and ascended the tree in late April prior to the onset of abnormally low spring temperatures. These low temperatures together with subsequent loss of foliage were undoubtedly a major control factor for this insect.

The infestation in the Park covered approximately 650 square miles with defoliation ranging from moderate to severe. The boundaries extended from Clear Lake northwest past Gunn Lake to the north boundary of tp. 23, rge. 26, W.P. mer., then in a southerly direction to Birdtail through Marco, Such, and Horod to the east end of Clear Lake. This area consists mainly of trembling aspen with a few scattered white spruce, black spruce and tamarack.

The infestation in the Duck Mountain Forest Reserve increased in size and covered approximately 500 square miles. It extended west from Grandview along the south boundary of the Reserve to Roblin, then north through Deepdale to the east boundary of tp. 28, rge. 23, W.P. mer. Throughout this area defoliation ranged from moderate to severe.

Collections of this insect were taken at widely scattered points along no. 10 highway north through Swan River, Birch River to the Overflowing River, also southwest of Swan River to Madge Lake and Boggy Creek but defoliation was light.

Infestation ratings and distribution are shown in Fig. 3.

5.3.3 Spruce Budworm, Choristoneura fumiferana (Clem.)

A further decline was noted in the spruce budworm populations in shelterbelts in the Kenville area, and only light defoliation of the new foliage was recorded. However collections were made at several new points throughout the district but loss of new foliage was nil. Distribution of the spruce budworm is shown in Fig. 5. A summary of budworm collections is shown in Table 3.

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

Little or no increase was noted in populations of this insect. Collections were again taken from most white spruce stands and shelterbelts examined in the district. Light to moderate defoliation was recorded on a few scattered white spruce in the townsite of Wasagaming. A summary of balsam-fir sawfly collections is shown in Table 3.

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

The status of this insect remained the same as the previous year. Defoliation was most conspicuous on shelterbelts in the agricultural areas with only light defoliation occurring in forested areas. The green-headed spruce sawfly was found in association with this insect but caused little or no defoliation. Severe defoliation of shelterbelts was recorded 1/2 mile north of Newdale, 4 miles east of Russel, and 23 miles northwest of Clear Lake. At Newdale, the foliage was very sparce due to previous years attacks and if the infestation persists it is doubtful if the trees will survive. Results of standard five tree beating samples of various host trees throughout the district during the larval feeding period is summarized in Table 3.

Table 3

Frequency of Occurrence of Sawflies and Budworms in Collections taken from White and Black Spruce at Sample Points in Western District of Manitoba 1958

Insect species	Host	No. of host tree samples	Percentage of samples containing larvae	Av. no. larvae per 5 tree sample*
Spruce budworm	wS	58	57	3
	bS	26	8	1
Black-headed budworm	wS	58	2	1
	bS	26	0	0
Yellow-headed spruce sawfly	wS	58	33	5
	bS	26	23	3
Green-headed spruce sawfly	wS	58	19	2
	bS	26	19	1
Balsam-fir sawfly	wS	58	39	7
	bS	26	0	0

* Positive samples only.

5.3.6 Forest Tent Caterpillar, Malacosoma disstria (Hbn.)

There was a definite increase in the distribution of the forest tent caterpillar over the previous year. Larval collections were made from Onanole in the south to Pine River in the north and as far west as Russel and Bield. Populations were at low levels and defoliation was light (2 per cent). For distribution see Fig. 2.

An egg band survey was carried out in late August and September in order to predict populations for 1959. Three trembling aspen were felled and the branches examined for egg bands at each of 22 examination points in the area where larvae were collected. Results of this survey are shown in Table 4. Indications are that populations will remain at low levels in 1959 through most of the area sampled last fall. Although larvae were collected during the summer at all points sampled, egg samples last fall using the standard 3 tree samples were mostly negative.

Table 4

Summary of Forest Tent Caterpillar Egg Band Counts Based on Examination of Trembling Aspen Trees at Twenty-two Points in the Western District of Manitoba in 1958

Place	Location				Average d.b.h.	Average height	Av. no. egg bands	Av. no. eggs per band	Per cent unemerged larvae	Per cent parasitism	Per cent diseased	Per cent emerged larvae	Forecast for 1959
	Sec.	Tp.	Rge.	Mer.									
Clear Lake	11	19	19	W.P.	4	50	0	0.0	0.0	0.0	0.0	0.0	nil
Clear Lake	5	20	21	W.P.	3	41	0	0.0	0.0	0.0	0.0	0.0	nil
Audy Lake	10	21	21	W.P.	4	45	0	0.0	0.0	0.0	0.0	0.0	nil
Gunn Lake	32	21	22	W.P.	5	55	0	0.0	0.0	0.0	0.0	0.0	nil
Gunn Lake	7	22	23	W.P.	4	45	0	0.0	0.0	0.0	0.0	0.0	nil
Crawford Park	32	19	19	W.P.	3	35	0	0.0	0.0	0.0	0.0	0.0	nil
Horod	27	18	21	W.P.	3	40	1.3	186	0.7	4.0	1.0	94.0	light
Seech	6	20	22	W.P.	3	36	0	0.0	0.0	0.0	0.0	0.0	nil
Olhd	31	19	23	W.P.	2	30	0	0.0	0.0	0.0	0.0	0.0	nil
Rossburn	20	20	25	W.P.	4	35	0.3	165	1.0	0.0	0.0	99.0	light
Silverton	27	20	27	W.P.	3	35	0	0.0	0.0	0.0	0.0	0.0	nil
Russel	34	20	28	W.P.	2	25	0	0.0	0.0	0.0	0.0	0.0	nil
Russel	32	22	28	W.P.	3	30	0.6	205	0.5	7.0	0.2	92.0	light
Inglis	33	22	29	W.P.	4	35	0.3	153	0.0	0.0	0.0	100.0	light
Inglis	3	23	27	W.P.	4	45	0	204	0.0	0.0	0.0	0.0	nil
Roblin	20	25	28	W.P.	4	40	0.3	0.0	1.0	2.0	0.5	96.0	light
Shevlin	33	25	27	W.P.	5	55	0	0.0	0.0	0.0	0.0	0.0	nil
Grandview	31	25	25	W.P.	4	45	0	0.0	0.0	0.0	0.0	0.0	nil
Grandview	26	25	24	W.P.	3	35	0	0.0	0.0	0.0	0.0	0.0	nil
Gilbert Plains	29	25	21	W.P.	3	35	0	0.0	0.0	0.0	0.0	0.0	nil
Russel	32	23	28	W.P.	3	40	0.6	174	0.3	1.0	0.3	98.0	light
Russel	20	24	28	W.P.	4	45	0	0.0	0.0	0.0	0.0	0.0	nil

5.3.7 Fall Cankerworm, Alsophila pometaria (Harr.)

Large numbers of this insect were again present on shade trees (Manitoba maple and elm) in the Swan River townsite. On May 28 a spraying program was carried out using 50 per cent water-wettable DDT applied with a high pressure water pump. Several checks were made in the following two weeks and the percentage of kill was very high and defoliation was very light. Little or no defoliation was recorded at Dauphin where in the previous year in some parts of the townsite defoliation was moderate to severe.

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

This insect caused very light damage to willow foliage in 1958. Moderate skeletonizing of the foliage was confined to two small areas; 3 miles north of Meadow Portage and the other 25 miles north of Biela. Throughout the remainder of the district damage was light. For distribution of this insect see Fig. 4.

5.3.9 White Pine Weevil, Pissodes strobi (Peck.)

Only one area of current damage to white spruce was recorded. This occurred near Gunn Lake in Riding Mountain National Park on trees 12-15 feet in height. About 5 per cent of the stand had dead tops.

5.3.10 Pitch-pine Midge, Cecidomyia banksianae Vockeroth

This insect was found in a stand of jack-pine reproduction 1/2 mile north of Cowan. Examination of 100 tips showed 8 infested.

5.3.11 Ugly Nest Tortrix, Archips cerasivorana Fitch.

Three small moderate infestations of this insect were recorded on chokecherry; (1) near Audy Lake; (2) 1/2 mile north of Cowan and (3) three miles north of Ethelbert. Elsewhere in the district where this insect was found, defoliation was light.

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

Open growing jack-pine near Novra was severely infested with this scale. This is the only area in the district where this insect was recorded.

5.3.13 Sawflies on Jack-pine, Neodiprion spp.

Three widely separated collections of these insects were made in the Western District; 5 miles east of Renwer, 13 miles east of Pine River and in the vicinity of Mafeking. Defoliation at all three locations was light.

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

There was very little change in the status of the poplar leaf beetle which was widely scattered throughout the entire district.

Moderate infestations were recorded in small areas of aspen reproduction near Biela, 14 miles north of Grandview and at Singoosh Lake. Light defoliation was recorded in two small areas covering approximately one acre

each and about 3 miles apart, about 10 miles west of Birch River.

Through the remainder of the district where collections were taken defoliation was very light.

5.3.15 Jack-pine Budworm, Choristoneura pinus Free.

No collections of this insect were taken this past season.

5.3.16 A Root Weevil, Hylobius sp.

A survey was carried out in two plots to determine the incidence of Hylobius sp. attacking white spruce. One plot was located in Riding Mountain National Park and the other in the Duck Mountain Forest Reserve. This study was carried out in conjunction with studies for the presence of Polyporus tomentosus in stand openings. Trees ranged from 6 to 12 inches d.b.h. in the plot at the Park and 4 1/2 to 9 inches d.b.h. in the Duck Mountain Forest Reserve. Tree height ranged from 28 to 50 feet in both plots. In each stand a one acre strip was cruised and the number of standing dead dominant and codominant trees were recorded. The root systems of 5 dead and 5 living trees were critically examined for Hylobius sp. and the number of diseased roots recorded. The results of the damage index and disease survey in the two plots is shown in Table 5.

Table 5

Hylobius sp. Damage Index Average at 2 Study Plots on 5 Living and 5 Dead Trees in the Western District

Area	Average d.b.h. (ins)		Average height		Av. damage index		Average percentage of roots diseased on living trees	Average percentage of diseased roots with insect damage on living trees
	Living	Dead	Living	Dead	Living	Dead		
R.M.N.P.	8	8	40	32	3.5	8.8	31	40
D.M.F.R.	7	6	39	33	1.8	5.5	3	20

5.3.17 Other Noteworthy Insects

Table 6

Other Noteworthy Insects
Western Manitoba
1958

Insect species	No. of collections	Host	Remarks
Tetralopha asperatella	3	tA	Very light
Arge pectoralis	2	wB	Very light
Acleris variana	1	wS	Very light
Proteoteras willingana	3	mM	Widely scattered but very light

Insect species	No. of collections	Host	Remarsk
Malacosoma lutescens	1	eCh	Very light
Petrova albicapitana	2	jP	Light R.M.N.P. and D.M.F.R.
Itonida balsamicola	2	bF	Light R.M.N.P. and D.M.F.R.
Dioryctria reniculella	5	wS	Common in R.M.N.P. very light
Chrysomela interrupta	1	bP	Very light
Chermes abietis	4	wS bS	Common but very light
Anoplonyx luteipes	19	L	Common but very light
Semiothisa sexmaculata	9	L	Common but very light
Paratetranychus ununguis	1	wS	Very light on trees Swan River
Monochamus sp.	1	bS	Roots of dead tree light
Hyphantria cunea	1	spAl	One light infestation found near Cowan.

5.4 TREE DISEASE CONDITIONS

5.4.1 Needle Cast of White Spruce, Macrophoma sp.

This disease caused very little damage to white spruce foliage in the Western District of Manitoba this past season. This may have been due to severe frost damage to the current year's foliage.

About 1 per cent of the trees examined were infected in the white spruce plantation at Audy Lake but damage was light. This same condition existed in a small mixed stand of white spruce and trembling aspen at Gunn Lake. Little or no damage was recorded on white spruce in the townsite of Wasagaming.

5.4.2 White-Pocket Rot, Polyporus tomentosus

A survey was carried out to determine the presence of P. tomentosus in two 1-acre cruise plots, one in Riding Mountain National Park and the other in the Duck Mountain Forest Reserve. In each plot only the standing dead, dominant and co-dominant white spruce, 4 inches d.b.h. and over were recorded. At each plot the root systems of 5 dead trees were examined and noted whether healthy, decayed or decomposed. The data recorded on the two 1-acre plots is shown in the accompanying Table 7.

Casual examination for this disease was made in an area of approximately 2 acres, 18 miles north of Clear Lake. The stand consisted of black spruce, jack-pine and a few scattered white spruce. In this stand about 15 per cent of the standing trees were dead. The root systems of 5 black spruce were examined and the fungus was found present in 3 of the 5 trees. Some insect

Table 7

Data Recorded from P. tomentosus Survey in Western District of Manitoba 1958

Location	Size of plot (acre)	Average tree height	Average age of stand	No. of trees examined	No. of patches per tree	No. of groups per acre	No. of single trees per acre	No. of healthy roots	No. of decayed roots	No. of decomposed roots	No. of root samples with P. tomentosus	No. of root samples with A. mellea	No. of root samples with unknown
W.M. 1 Sec. 1, tp. 20, rge. 19, W.P.m.	1	60	51	5	0	3	6	0	21	11	8	0	0
W.M. 2 Sec. 22, tp. 30, rg.e 25, W.P.m.	1	70	55	5	[illegible]	2	7	1	32	19	8	0	0

damage was also noted on the roots examined of both the dead black spruce and jack-pine.

5.4.3 Spruce Needle Rust, Chrysomyxa sp.

This infection was found widely scattered throughout the district. Damage generally was very light with the exception of a few spruce near Whirlpoool Lake and Audy Lake in Riding Mountain National Park and at Singoosh Lake in the Duck Mountain Forest Reserve where damage was moderate.

5.4.4 Other Noteworthy Diseases

Table 8

Other Noteworthy Diseases
Western District of Manitoba 1958

Host	Location	Disease	Remarks
bS	Riding Mountain N.P.	Brown cubical rot	Very light
jP	Riding Mountain N.P.	Needle rust	Light
wS	Riding Mountain N.P.	Brown cubical rot	Little damage
wS	Riding Mountain N.P.	Armillaria root rot	Very light
wB	Riding Mountain N.P.	White mottled rot	About 5 per cent of birch dead (with conks)
tA	Grandview	Slash decay	Common

5.5 SPECIAL PROJECTS

5.5.1 Special Collections

Several collections of insect material were made for special projects being conducted at Winnipeg and other laboratories. The purpose and type of collections are shown in Table 9.

Table 9

District	Type of collection	No. of collections	Days spent making collections (including travel)
Western Manitoba	Balsam-fir sawfly	15	2
	Yellow-headed spruce sawfly parasite studies	1	1/2
	Fall webworm parasite studies	1	1/2
	Striped alder sawfly parasite studies	2	1
	Larch sawfly parasite studies	2	6
	Aphids for G. Bradley, Winnipeg Laboratory	6	1/2

5.5.2 Phenological Studies

Phenological studies were again carried out at selected points in the district. The time of the first measurements varied considerably in Riding Mountain National Park and Duck Mountain Forest Reserve owing to higher altitutdes and late spring frosts which destroyed most of the early shoots.

Tree species and study locations are given in **Table 10.**

Table 10

Phenological Study Plots
Western Manitoba 1958

Location of Plots					Dates	Tree species represented
Place	Sec.	Tp.	Rge.	Mer.	examined	on plot
R.M.N.P.	10	19	17	W.P.	14-6-58 8-9-58 20-6-58 8-9-58 19-7-58 8-9-58	Jack-pine, trembling aspen, white spruce, tamarack.
D.M.F.R.	32	30	24	W.P.	12-6-58 21-8-58 1-7-58 21-8-58	Jack-pine, white spruce, trembling aspen
Pine River	31	32	22	W.P.	12-6-58 27-9-58	Jack-pine, trembling aspen, white spruce.
Mafeking	32	44	25	W.P.	11-6-58 16-9-58	White spruce, jack-pine, trembling aspen, tamarack.

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

1958

by

J. B. Martin

INTERIM REPORT

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

March 1959

6.1 INTRODUCTION

This report covers the Northern Forest District of Manitoba. It deals with Forest Biology Ranger activities and describes in detail forest insect and tree disease conditions within the district.

The field season extended from May 20 to September 27 but was interrupted through most of July while awaiting a vehicle replacement. This left a total of 103 days in the field.

During this period surveys were conducted to determine the distribution and status of forest insects and tree diseases. The boundaries of major insect species that occurred in infestation proportions were mapped during road, boat and aerial travel.

In addition, numerous special studies related to survey sub-projects were carried out. Details of these studies are given in this report.

A total of 23 flying hours were used for aerial surveys, and mapping of infestations. Nine hours of this time were supplied by the Manitoba Forest Service. The Manitoba Forest Service also supplied a boat for 100 miles of travel. The co-operation of the Manitoba Forest Service and others is gratefully acknowledged.

The most noteworthy changes in the status of major insects and diseases were: (1) the spread of the spruce budworm in the Namew Lake area; and (2) the increase in larch sawfly infestations in the northern part of the district.

6.2 REVIEW OF FOREST INSECT AND TREE DISEASES

The spruce budworm infestation on the Manitoba - Saskatchewan border near Namew Lake extended and now covers about 600 square miles. The extensions were to the northwest and to the east.

Populations of the larch sawfly increased noticeably in the area between Granville, Laurie and Lynn lakes in the north and remained at low levels in the southern portions of the district. No changes were observed in the status of tree diseases in the Northern District this year. This was due to the fact that no now areas could be examined in 1958 because of time lost in July.

6.3 INSECT CONDITIONS

6.3.1 Larch Sawfly, Pristiphora erichsonii (Htg.)

The larch sawfly infestations remained much the same as in 1957 in the Northern District except for an increase in populations in the northern area between the Churchill River and Reindeer Lake.

Light defoliation was recorded in all tamarack bogs examined from the Overflow River in the south to Wekusko in the north. Aerial surveys were conducted again in 1958 and revealed moderate to heavy defoliation around

Burntwood, Highrock, Pukatawagan, Granville, Laurie and Lynn lakes. For detailed information on areas defoliated see map, Fig. 1.

Populations of the insects Anaplonyx luteipes and Semiothisa sexmaculata, which are commonly associated with larch sawfly, remained at low levels and fewer of these insects were observed than in 1957.

Population counts were again made in all permanent study plots in the district using techniques outlined in the 1957 report. Infestation ratings are shown in Table 1.

Table 1

Larch Sawfly Infestation Ratings in Permanent Sample Plots
Based on the Proportion of Current Shoots Utilized for Oviposition

Plot no.	Place	Total shoots	Curled shoots	Infestation rating
101	The Pas, Manitoba sec. 24, tp. 57, rge. 26 W.P.mer.	70	2	light
102	Cranberry Portage, Manitoba sec. 18, tp. 61, rge. 27 W.P.mer.	50	0	light
103	Beaver Lake, Saskatchewan sec. 17, tp. 63, rge. 1 W. 2mer.	60	1	light
105	The Bog, Manitoba sec. 20, tp. 50, rge. 25 W.P.mer.	60	1	light

Studies on parasitism and disease of larch sawfly were continued in 1958, but the method of collecting cocoons for dissections was modified to obtain refined estimates of the parasite, Bessa harveyii. Larval drop trays were set out in 2 permanent sample plots in the early summer. At the end of larval drop period cocoons were collected and dissected during the winter months. Estimates on parasitism and disease in the two permanent study plots are summarized in Table 2.

The results of this study indicate that Bessa harveyii is still the most noteworthy parasite of the larch sawfly. The 60 per cent parasitism shown in plot 101 is the highest estimate yet recorded for this species in study plots in Manitoba and Saskatchewan.

Table 2
Summary of Larch Sawfly Parasitism and Disease as Determined by Larval Dissections
Northern Manitoba 1958

Plot no.	Location	No. of trays	No. of cocoons collected	Av. no. of cocoons per tray	No. of cocoons destroyed by small mammals	No. of cocoons destroyed by fall Bessa emergence	No. of cocoons examined	No. of sawfly larvae containing Mesoleius egg	No. of sawfly larvae containing Mesoleius larva	Per cent effective parasitism based on sound larvae B. harveyi	Per cent effective parasitism based on sound larvae M. tenthredinis	Per cent effective parasitism based on sound larvae T. klugii	Per cent larvae diseased	Per cent larvae dead from other causes
101	The Pas	20	302	15	11	8	282	51	25	60.1	10.6	0	2.1	14.5
102	Cranberry Portage	20	334	17	9	5	229	23	26	37.5	13.0	0	3.9	4.8

6.3.2 Spruce Budworm, Choristoneura fumiferana (Clem.)

The spruce budworm infestation in the vicinity of Namew Lake showed a further extension of boundaries (Fig. 6). It spread northwest to the north end of Amisk Lake and included Mosher Lake. The spread to the east included Schist Lake, Baker's Narrows and most of Rocky Lake. A small increase was noted to the southwest and now includes Limestone Narrows, Namew Lake. Two small isolated infestations were observed on the northeast shore of Atikamig Lake, about 15 miles from the nearest severe infestation. These small areas were on points in the lake and would be less than one acre in size.

The comparative acreage of severe defoliation from 1953 to 1958 is shown in Table 3.

Table 3

Acreage of White Spruce and Balsam Fir Stands Severely Defoliated by the Spruce Budworm in the Namew Lake Area 1953 to 1958 Inclusive

Year	Acres severely defoliated	Per cent total foliage destroyed	Per cent current foliage destroyed
1953	2,500	40	95 - 100
1954	5,000	50	95 - 100
1955	16,000	50	95 - 100
1956	60,000*	45	90
1957	170,000*	40	85
1958	400,000*	45	80

* No correction for areas not containing susceptible stand.

Aerial and ground surveys of the area showed as in previous years, balsam fir and white spruce reproduction in the understory were completely stripped of foliage. Back feeding on old foliage was again observed in the upper crown of mature spruce and terminal growth was suppressed in areas that were severely infested in 1957.

Populations of Dioryctria reniculella, a foliage worm, often found with spruce budworm, increased sharply in all infested areas.

Population counts based on the numbers of spruce budworm egg masses per 18 inch branch of white spruce were made in ten locations in and near the infested area. The results of these counts together with those from previous years are shown in Table 4.

Refined techniques for estimating egg populations on white spruce have not been developed. The counts shown in Table 4 can only be used on a comparative basis. Indications are that populations remain high in the old infestation area and at sampling points which have recently become infested. For interpretation of Table 4 the reader is referred to Fig. 6.

Table 4

Number of Spruce Budworm Egg Masses per 18 inch White Spruce Branch
Namew Lake Infestation
1953 to 1958 Inclusive

Year	Sample											
	Pt.A	Pt.B	Pt.C	Pt.D	Pt.E	Pt.F	Pt.G	Pt.H	Pt.I	Pt.J	Pt.K	Pt.L
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	-	-	-	-	-	-
1957	0.8	4.1	-	0.0	0.1	1.7	0.2	3.0	3.2	-	-	-
1958	1.8	8.8	-	0.2	0.0	2.5	3.2	1.7	-	1.3	0.4	2.2

Table 5 shows points outside of the main infestation area at which five tree beating samples of white spruce gave positive budworm collections at low population levels.

Table 5

Locations of Positivie Samples of Spruce Budworm with Low Populations
Northern District 1958

Location	Province	Tp.	Rge.	Mer.
Amisk Lake (south end)	Saskatchewan	62	1	W.2
Meridian Creek	Saskatchewan	63	1	W.2
Denare Beach	Saskatchewan	65	1	W.2
Pine Root River	Manitoba	65	28	W.P.
Baker's Narrows	Manitoba	65	27	W.P.
Cranberry Portage	Manitoba	65	26	W.P.
Simonhouse	Manitoba	63	26	W.P.
Goose Lake	Manitoba	62	26	W.P.
Atik	Manitoba	61	27	W.P.
Wanless	Manitoba	60	26	W.P.
Rocky Lake	Manitoba	60	27	W.P.
Reeder Lake	Manitoba	57	27	W.P.
Atikameg Lake	Manitoba	58	25	W.P.
Freshford	Manitoba	54	26	W.P.
Westray	Manitoba	53	27	W.P.
Overflowing River	Manitoba	48	25	W.P.
Bradbury's Bluff	Manitoba	46	25	W.P.

6.3.3 Large Aspen Tortrix, Choristoneura conflictana (Wlk.)

While more of these insects were observed in 1958 than in 1957 populations remained at low levels and no discernable defoliation was apparent. The insect was present in 15 out of 40 aspen samples but the average numbers of insects per five tree sample was two. The large aspen tortrix was found from Overflow north as far as Flin Flon.

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

While this insect was commonly found over a large area between Overflow and Cranberry Portage, no conspicuous defoliation was recorded. Infestations reported last year at the Overflowing River, Amisk, Hanson and Wabishkok lakes subsided to the point where only scattered insects were found. A marked decline in numbers was also evident in the old infestation area from The Pas to Atik Lake.

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

Populations of the gray willow-leaf beetle were generally lower than in 1957. Willow foliage was late in developing, which may have had a bearing on insect development. Light skeletonizing of the foliage was seen at Westray and Simonhouse, otherwise no appreciable damage was recorded. See map Fig. 4 for further details.

6.3.6 Sawflies on Jack-pine, Neodiprion spp.

Four species of Neodiprion sawflies were found on jack-pine in the Northern District in 1958. The species were: N. virginiana, N. nanulus nanulus and Neodiprion sp. possibly banksianae or prati banksianae. These are collectively referred to as Neodiprion virginiana complex. This complex in 1958 spread further north and decreased in intensity in the south. The severity of attack is greater in the northern portion of the district. Jack-pine at Grace Lake, near The Pas, has suffered a heavy infestation for three years. Jack-pine from the Overflowing River north to Laurie Lake was defoliated as shown in Table 6. In every case, where appreciable defoliation occurred, it was the old needles which were destroyed. The current growth does not seem to be as attractive to this complex.

Table 6

Defoliation Record of Jack-pine Attacked by
Neodiprion spp. Sawflies
Northern District 1958

Location	Grid	Old foliage defoliation	Remarks
Baden	7-045-304	3%	Scattered trees
Westray	7-040-316	5%	Open growing trees
Freshford	7-041-318	5%	Mature stand
Grace Lake	7-041-321	80-100%	Scattered in tamarack swamp
The Pas	7-041-322	5%	Regeneration
Tremardan	7-043-323	3%	Mixed stand, mature.
Wanless	7-040-326	5-10%	Scattered in mature spruce
3rd Cranberry Lake	7-043-336	15%	Stand mostly spruce
Russick Lake	7-048-348	5%	Mature mixed stand
Laurie Lake	7-035-368	60%	Scattered pine in black spruce swamp

6.3.7 A Root Weevil, Hylobius sp.

A survey to determine the incidence of Hylobius sp. root weevils on spruce was carried out near Simonhouse and Beaver lakes in the Northern District in 1958. At each location the root systems of 5 living and 5 dead trees were examined for the incidence of Hylobius and root disease.

In the Simonhouse Lake plot, white spruce ranged from 6 to 16 inches d.b.h. and from 40 to 85 years old. The dominant trees were from 50 to 70 feet in height. Hylobius damage occurred on the roots of 9 of the 10 trees examined. The other tree was too badly decomposed to detect Hylobius damage. The disease Polyporus tomentosus was found on 3 of the 5 dead trees.

At Beaver Lake the d.b.h. ranged from 4 to 8 inches. The age of the dominant trees in this stand ranged from 45 to 70 years with heights of 32 to 50 feet. All 10 trees examined in this plot showed Hylobius damage and every tree had diseased roots.

The average damage index by Hylobius sp. was 2.5 at Simonhouse and 6.2 at Beaver Lake. This and other information is summarized in Table 7.

Table 7

Hylobius sp. Damage Index and Percentage Diseased Roots in a Ten Tree Sample

Simonhouse Lake Plot 1958

Tree No.	Living	Dead	d.b.h.	Hylobius damage index	Per cent roots diseased	Height	Per cent of diseased roots with insect damage
1	x		10	2.2	0	60	0
2	x		8	2.6	0	40	0
3	x		9	0.2	5	45	0
4	x		9	0.1	0	50	0
5	x		12	0.2	0	70	0
6		x	16	6.8	66	70	100
7		x	9	-	-	55	-
8		x	9	6.5	100	55	60
9		x	6	3.7	100	45	0
10		x	6	2.7	100	45	12

Beaver Lake Plot 1958

1	x		8	0.8	7	42	0
2	x		9	1.8	7	50	0
3	x		5	5.1	80	32	100
4	x		7	2.7	23	42	66
5	x		7	5.3	20	45	100
6		x	4	10.0	100	38	100
7		x	5	7.4	71	40	100
8		x	5	10.0	100	42	100
9		x	5	10.0	100	38	100
10		x	7	9.2	100	48	100

6.3.8 Other Noteworthy Insects

Table 8

Other Noteworthy Insects
Northern District 1958

Insect species	No. of collections	Host	Remarks
Chermes abietis (L.)	5	wS	Common north of Cranberry Portage
Petrova albicapitana (Busck.)	12	jP	Light infestations common especially on regeneration
Pissodes strobi (Peck.)	1	wS	Wanless, Manitoba
Halisidota maculata Harr.	1	Wil.	Clearwater Lake. Fewer than last year.
Hyphantria cunea Harr.	9	Sk. wB Wil.	Common in The Pas - Wanless area
Sciaphila duplex Wlshm.	1	tA	Sturgeon Landing, Sask. Population decreased
Epinotia nisella criddleana Kft.	8	tA	Light leaf rolling from The Pas, south
Mordwilkoja vagabunda Walsh.	2	tA	Light in Bowsman - Birch River area
Arge clavicornis Fab.	5	wB	The Pas area
Lithocolletis salicifoliella Chamb.	3	tA	Very widely scattered. Negligible damage
Acrobasis betulella Hulst.	8	wB	Overflowing River to Wanless. Very little damage
Bibio sp.	3	wB tA	Mafeking - Overflowing River area
Semiothisa sexmaculata Pack.	8	tL	Lighter than last year
Anoplonyx luteipes (Cress.)	6	tL	Lighter than last year
Tetralopha asperatella (Clem.)	few	tA pB	On scattered regeneration from Atikameg to Reed Lake
Neodiprion abietis (Harr.)	1	Sw	On one tree at Russick Lake (grid 7-048-358)
Pikonema alaskensis (Roh.)	few	Sw	Widely scattered from Overflowing River to Thicket Ptge. No defoliation
Pikonema dimmockii (Cress.)	few	wS bS	Low populations seen from Overflowing River to The Pas. No defoliation
Hemichroa crocea (Fourcroy)	1	aL	On only 3 small patches of alder near Reed Lake
Herculia thymetusalis (Wlk.)	1	bS	Wanless Manitoba. Negative samples near Overflowing River, The Pas and Flin Flon
Archips cerasivorana (Fitch.)	9	tA rose Sk. cCh	Damage was light from the Southern Boundary to Baker's Narrows
Toumeyella numismaticum (Pettit. & McD.)	2	jP	One tree attacked at Novra and one at Grace Lake

6.4 TREE DISEASE CONDITIONS

6.4.1 Mistletoe on Jack-pine, Arceuthobium americanum

No change was noted in the boundaries or in the intensity of infection by this parasitic plant in 1958. In one stand near Novra, Manitoba, the mistletoe was parasitized by Walrothiella arceuthobium.

6.4.2 A Fungus of Jack-pine Mistletoe, Walrothiella arceuthobium

One collection of this fungus which attacks the female plant of jack-pine mistletoe was recovered from an old infection near Novra, Manitoba as noted above.

6.4.3 Dwarf Mistletoe on Black Spruce, Arceuthobium pusillum

The extent of distribution of this mistletoe parasite remained unchanged in 1958. Samples were taken from the old infestation near Westray, Manitoba.

6.4.4 The White-Pocket Rot, Polyporus tomentosus

Three collections of this disease were made at Amisk Lake and one at Simonhouse Lake. It was quite common in mature spruce stands at both locations.

One acre plots were measured in mature white spruce stands and information was taken as to tree heights, ages, number of dead trees and size of groups of dead trees. Five dead trees in each plot were thoroughly examined and the roots were recorded as healthy, decayed or decomposed. Samples were submitted to the Forest Pathology Laboratory and the diseases were recorded. All this information is found tabled in Table 9.

6.4.5 The Mushroom, Flammula alnicola

A survey was conducted for this mushroom in late August when mushrooms were growing well. Spruce stands were examined near The Pas, Cranberry Portage and Beaver Lake. Many similar mushrooms were found but no Flammula alnicola was noted.

6.4.6 Animal Damage to Poplar

A ten acre stand of young trembling aspen two miles northwest of Birch River, Manitoba was examined and about 10 per cent of the trees had the top third of the main stem killed.

From 9 to 14 inches of bark had been removed from the trunk of each tree examined. The damage was in each case found where the trunk was about one inch in diameter. The damage occurred from 10 to 25 feet above the ground.

No positive signs of animal feeding were observed. From samples submitted, the Forest Pathology Laboratory diagnosed the damage as small mammal feeding.

A few cankers were observed but did not appear to have any association with the injury.

Table 9

Data Recorded during Survey for Occurrence of White-Pocket Rot, P. tomentosus
Northern Manitoba 1958

Location	Size of plot (acre)	Av. tree height	Av. age of stand	No. of trees examined	No. of patches per acre	No. of groups per acre	No. of single trees per acre	No. of healthy roots	No. of decayed roots	No. of decomposed roots	No. of root samples with		
											P. tomento-sus	A. mellea	un-known
Simonhouse Lake Plot 1	1	60	85	5	2	2	12	11	17	11	2	0	0
Amisk Lake Plot 2	1	55	60	5	1	4	13	3	31	3	6	0	0

6.4.7 Other Noteworthy Diseases

Table 10

Other Noteworthy Diseases
Northern District of Manitoba
1958

Host	Location	Disease	Remarks
Jack-pine	Orok, Manitoba	Globose rust gall	Common
Jack-pine	Big Eddy, Manitoba	Needle rust	Small local infestation
Spruce	Atik and Wanless, Man.	Yellow witches' broom	Common
Jack-pine	Root Lake, Manitoba	Comandra blister rust	Widespread
Jack-pine	Tremaudan, Manitoba	Needle cast	One tree only
T. aspen	Wanless, Manitoba	White trunk rot	Widespread infestation
T. aspen	Wanless, Manitoba	White trunk rot	Widespread infestation
T. aspen	Wanless, Manitoba	Canker on aspen	Common
T. aspen	Wanless, Manitoba	Slash decay	Slash fungus only
W. birch	Wanless, Manitoba	White trunk rot	Common over large area

7. ANNUAL REPORT OF FOREST BIOLOGY RANGER HUDSON BAY DISTRICT OF SASKATCHEWAN

1958

by

A. Machuk

INTERIM REPORT 1958

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

March 1959

7.1 INTRODUCTION

The field season in the Hudson Bay District of Saskatchewan extended from mid-May through the end of September. Surveys were carried out during this period to determine the status and distribution of forest insects and tree diseases. Several special studies relating to Survey work were also conducted, the details of which are outlined in this report.

A total of 359 insect and 19 tree disease samples were submitted to the Winnipeg and Saskatoon laboratories. In addition, several mass collections of the large aspen tortrix larvae and pupae were submitted for parasite and disease studies. Approximately 6 hours flying time was provided by the Saskatchewan Department of Natural Resources which facilitated mapping of insect defoliation in the Northern and Porcupine provincial forests. Three hours of chartered flying were utilized to map large aspen tortrix infestations in the Aspen Grove regions of the district.

The assistance and co-operation received from personnel of the Department of Natural Resources and private co-operators is gratefully acknowledged.

7.2 REVIEW OF FOREST INSECT AND TREE DISEASE CONDITIONS

Insect conditions in the district were highlighted by (1) the continued defoliation of trembling aspen in the Aspen Grove belt by the large aspen tortrix; (2) increased populations of the forest tent caterpillar in the Beaver Hills area; (3) increased numbers of the yellow-headed spruce sawfly in farm shelterbelts and ornamental plantings; and (4) a marked rise in populations of Neodiprion sawflies on young jack-pine in the Northern Provincial Forest.

Populations of the larch sawfly although widespread throughout the northern areas of the district remained more or less static. Scattered collections of the spruce budworm were taken in the southern agricultural areas but populations were very light.

The white-pocket rot, Polyporus tomentosus, was collected in several white spruce stands in the Porcupine and Northern provincial forests. A needle rust, Coleosporium solidaginis was prevalent on jack-pine regeneration in the Hudson Bay area and in the Torch River Provincial Forest. A heavy infection of the canker, Cytospora chrysosperma on Russian poplar was recorded in a shelterbelt 4 miles north of Foam Lake.

Late spring frosts and unusual weather conditions resulted in varying degrees of damage to foliage of several tree species throughout the district.

7.3 INSECT CONDITIONS

7.3.1 Large Aspen Tortrix, Choristoneura conflictana (Wlk.)

The infestation of large aspen tortrix which has covered a large portion of the Aspen Grove region since 1956 persisted in 1958 (Fig. 3). Within this region an area of approximately 3800 square miles was infested. Varying degrees of defoliation ranging from moderate to severe occurred in a band approximately 50 miles wide in a southeasterly direction from Hendon to the south boundary of the district.

Moderate to heavy defoliation was also recorded in scattered aspen stands north and east of Yorkton extending nearly to the Manitoba boundary. Two small localized infestations were recorded in the Porcupine Provincial Forest, one along the south boundary of Greenwater Lake Provincial Park and the other between Usherville and Ushta Tower on both sides of No. 9 highway and covering an area of 12 square miles. In this latter area heavy predation by the stink bug, Podisus modestus, was observed.

In the Northern Provincial Forest only an occasional larva was found and there was little or no defoliation. Sixty-nine per cent of samples collected from trembling aspen contained large aspen tortrix.

An aerial survey was carried out in the southern portion of the district in order to map areas of large aspen tortrix defoliation. At the time of the survey refoliation was well advanced and a subsequent ground check showed fairly good new foliage production.

Four mass collections were taken in the heavily infested areas of the districts for parasite studies. Larval collections were made when the first pupae appeared in the field. Pupal collections were taken when the first adult moths emerged. The results of the parasite studies are shown in Table 1.

Table 1

Results of Parasite Studies of the Large Aspen Tortrix in the Hudson Bay District of Saskatchewan 1958

Location of collection point		Type of	No.	Parasites recorded		Per cent
Place	Grid	collection	reared	Hyms.	Dips.	parasitism
Sheho	7-019-284	larvae	146	16	7	15.7
Kelvington	7-016-290	larvae	148	22	7	19.6
Sheho	7-019-284	pupae	145	12	6	12.4
Kelvington	7-016-290	pupae	180	5	1	3.3

7.3.2 Larch Sawfly, Pristiphora erichsonii Htg.

Light larch sawfly populations were widespread throughout all tamarack stands in the district (Fig. 1). Larval collections were made and light defoliation of tamarack was recorded east of Hudson Bay and north to the Carrot River. Scattered patches of light defoliation were observed along the Armit Ridge road.

In the Madge Lake area and along the southern slopes of the Porcupine Provincial Forest only light populations were encountered and little or no defoliation was evident. It was uncommon in this area to find more than one or two sawfly colonies per tree.

In the Nipawin - Carrot River areas and along the Flin Flon Highway very light defoliation was observed.

During the month of August, an aerial survey to map areas of larch sawfly defoliation was carried out over the northern section of the district. Scattered trees in large semi-open tamarack bogs between McKenzie and Suggi lakes showed moderate defoliation to the upper crowns. Light to moderate defoliation was recorded in several small stands east of Bigstone Lake.

Due to low populations of larch sawfly it was not possible to make mass collections of cocoons for parasite appraisals. However, light to moderate parasitism of larch sawfly larvae was observed in many areas of the district. In tp. 44, rge. 2, W.2, an examination of 28 larvae from two colonies revealed that 12 were parasitized by Bessa harveyi.

Shoot production and needle growth in the younger stands was very good while in the mature stands and those approaching maturity scanty shoot production and short needle growth was the rule.

Sequential sampling was carried out at three permanent sample plots in the district. Results of this sampling are shown in Table 2.

Table 2

Infestation Rating of the Larch Sawfly in
Permanent Sample Plots
Hudson Bay District of Saskatchewan
1958

Plot no.	Place	Sec.	Tp.	Rge.	Mer.	No. of shoots examined	No. of curled tips	Infestation rating
101	Armit	15	44	2	W.2	60	1	light
106	Pelly	15	34	32	W.P.	50	0	light
107	Otosquen	35	48	2	W.2	60	1	light

7.3.3 Forest Tent Caterpillar, Malacosoma disstria (Hbn.)

Larval collections of this insect were made at a number of points in the district (Fig. 2). The majority of samples were from the Beaver Hills area and north to Fishing Lake. Two samples consisting of 1 larva each were collected at Saginas and Peepaw Lake in the Porcupine Provincial Forest and two isolated samples near Tobin and Squaw Rapids along the shore of the North Saskatchewan River. At all points of inspection, populations were light, seven larvae being the largest number taken from a five tree beating sample.

In the southern region forest tent caterpillar was associated with large aspen tortrix and it was difficult to attribute any definite percentage of defoliation to the tent caterpillar.

To predict population trends and probably intensity of attack in 1959 an egg band survey was carried out in September 1958. This survey commenced where larvae were found most abundant and from this point three trees were felled at 5 mile intervals in each cardinal direction and the branches were examined for egg bands. The results obtained in this survey are shown in Table 3.

Indications are no extensive infestation will occur in the Hudson Bay District in 1959. Light defoliation will be restricted to the Beaverdale - Sheho areas.

7.3.4 Spruce Budworm, Choristoneura fumiferana (Clem.)

Four collections of this insect were taken at the following points: Madge Lake, Foam Lake, Tuffnell and McBride Lake. All collections consisted of a single larva each, with the exception of the one from a shelterbelt near Foam Lake. This collection consisted of 3 larvae and 1 pupae. In each case only a trace of defoliation was observed.

During aerial surveys of the northern part of the district a small area of what was possibly budworm defoliation was recorded northwest of Cumberland House. During the winter a sample and report of budworm defoliation was received from tp. 54, rge. 4, W.2, immediately north of the Carrot River. An intensive aerial survey of this area is planned for 1959.

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

Larvae of this insect were common on aspen reproduction throughout the district but heavy defoliation was confined to the northern areas. Leaf beetles caused heavy defoliation to aspen in the Porcupine Provincial Forest near Saginas and Peepaw lakes. Generally only relatively small areas were affected and defoliation was confined to reproduction trees bordering stands of mature aspen. "Pockets" of moderate to heavy defoliation occurred along the Arnit Road to the Manitoba boundary, near McBride Lake and north of Hudson Bay to the Carrot River.

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

Light populations of this sawfly were recorded over widely separated areas in the agricultural regions of the district. In most instances defoliation was confined to a few twigs per tree with the exception of a small planting

Table 3

Summary of Forest Tent Caterpillar Egg Band Counts Based on Examination of 3 Trembling Aspen Trees at 13 Points Hudson Bay District 1958

Place	Location Sec.	Tp.	Rge.	Mer.	Average d.b.h.	Average height	Av. no. of egg bands	Per cent eggs containing living larvae	Per cent parasitized	Forecast for 1959
11 mi. W. Beaverdale Cr.	1	26	9	W.2	3"	30'	.3	96.4	3.6	light
3 mi. S. Sheho	22	29	9	W.2	4"	33'	1.7	96.6	3.4	light
5 mi. E. Sheho	20	29	8	W.2	4 1/2"	31'	.3	97.3	2.7	light
2.5 mi. N. Sheho	21	30	9	W.2	3 1/2"	32'	.3	98.1	1.9	light
3 mi. W. Willowbrook	6	26	6	W.2	3"	28'	0.0	0.0	0.0	nil
Ituna	3	26	11	W.2	4 1/2"	39'	0.0	0.0	0.0	nil
6 mi. E. Fonehill	31	25	4	W.2	2"	20'	0.0	0.0	0.0	nil
10 mi. S. Willowbrook	16	24	6	W.2	2 1/2"	21'	0.0	0.0	0.0	nil
5 mi. N. Beaverdale	9	27	7	W.2	2 1/2"	23'	0.0	0.0	0.0	nil
13 mi. S. Sheho	2	28	9	W.2	4"	37'	0.0			nil
6 mi. W. Sheho	10	30	10	W.2	4"	41'	0.0	-	-	nil
9 mi. W. Sheho	7	30	10	W.2	3"	31'	0.0	-	-	nil
Peppaw Lake	10	40	2	W.2	5 1/2"	50'	0.0	-	-	nil

east of Codette where ornamental white spruce were heavily attacked and suffered the loss of all current foliage.

Near Greenbush several reproduction white spruce ranging from 1 1/2" to 2 1/2" d.b.h. were moderately defoliated of current foliage.

In all other areas only a trace of defoliation by this species was recorded.

7.3.7 Balsam Fir Sawfly, Neodiprion abietis (Harr.)

Light populations of this sawfly were found at scattered points throughout the district. A shelterbelt 2 1/2 miles south of Hudson Bay was lightly defoliated before control measures were applied. Good control was obtained after spraying with DDT and subsequent examination using the 5 tree beating sample turned up an average of only .5 larva per tree.

Moderate populations of N. abietis were also encountered in a white spruce shelterbelt near Weekes and the owner was given information on control methods.

Elsewhere in the district only an occasional larva was taken in beating samples and little or no defoliation was recorded.

7.3.8 White Pine Weevil, Pissodes strobi Peck.

Two small areas of white pine weevil damage were recorded in the district.

A small stand of white spruce reproduction in tp. 43, rge. 31, W.P.mer. ranging in height from 6' to 14' and approximately 2 to 3 1/2" d.b.h. showed heavy leader damage. Nearly 50 per cent of the trees in this area were infested and dead and dying tops were quite conspicuous.

Approximately 4 acres of young white spruce south of Peepaw Lake was moderately attacked. A tally of young white spruce showed 25 per cent with infested leaders.

Several scattered collections of this weevil were made north of Hudson Bay but in each instance only one or two trees in the immediate area were affected.

7.3.9 Boxelder Twig Borer, Proteoteras willingana Kearf.

Samples of this species were taken from nearly all Manitoba maple shelterbelts and mature stands in this district. Heavy populations were recorded in mature maple growing along the shores of the Assiniboine River near No. 5 highway. Dead twigs and branches were quite common in this stand.

Throughout the rest of the district only light twig borer activity was recorded. The most northerly point from which larvae of this insect were taken was from a native stand of Manitoba maple in tp. 47, rge. 2, W. 2 mer.

7.3.10 A Root Weevil, Hylobius sp.

During the month of August a survey of accessible spruce stands in the Porcupine and Northern provincial forests was undertaken to determine the distribution of this weevil. In all stands examined larvae were taken or old and new damage to the root systems of spruce trees was observed. In many instances where old scars were observed on mature and overmature spruce many of the roots had been attacked by disease organisms and were rotten or decomposed.

Moderate to severe girdling of roots was recorded in a large spruce stand along the Armit River trail 4 miles south of the Armit Road. In this area many mature trees have been windthrown and the exposed roots showed evidence of past damage by this insect.

Special examination of spruce was carried out in two plots to determine the incidence of attack by Hylobius sp. weevils. Results of these examinations are shown in Table 4.

At area #1 located on sec. 15, tp. 42, rge. 3, W. 2 mer. in the Porcupine Provincial Forest spruce trees in the plot ranged in height from 65 to 95 feet and 8 to 16 inches d.b.h. with an average age of 85 years.

Area #2 was situated 28 miles northeast of White Fox along the Flin Flon highway. Spruce in this stand averaged 10 inches d.b.h. and 60 feet in height.

On each plot five living and five dead trees were selected at random and the root systems were examined for girdling by this insect. All trees examined in both plots had been damaged by this weevil at one time or another and the presence of current scars was evident.

Table 4

Hylobius sp. Damage and Percentage Diseased Roots
in a Ten Tree Sample Area #1 - 1958
Porcupine Plot

	Tree no.	d.b.h. (ins.)	Tree height (ft.)	Hylobius damage index	Total Percentage of roots diseased	Percentage of diseased roots with insect damage
LIVING	1	11	70	4.8	70.6	100.00
	2	14	85	6.6	50.0	100.00
	3	10	68	1.07	00.0	00.00
	4	12	75	4.7	34.0	100.00
	5	14	85	0.0	00.0	00.00
DEAD	6	10	65	0.0	00.0	00.00
	7	8	55	8.0	100.0	100.00
	8	7	55	8.4	100.0	100.00
	9	6	55	8.9	100.0	100.00
	10	9	60	9.8	100.0	100.00

Area #2
Torch River Plot

	Tree no.	d.b.h. (ins.)	Tree height (ft.)	Hylobius damage index	Total Percentage of roots diseased	Percentage of diseased roots with insect damage
L	1	10	60	3.9	63.6	57.1
I	2	12	70	1.1	10.5	00.0
V	3	11	66	6.4	76.4	61.5
I	4	8	58	7.4	72.7	75.0
N	5	9	62	6.7	74.0	63.6
G						
D	6	6	50	6.2	100.0	100.0
E	7	5	50	5.8	100.0	70.0
A	8	7	55	5.6	100.0	63.6
D	9	10	62	6.3	100.0	100.0
	10	6	55	5.8	100.0	75.0

7.3.11 Sawflies on Jack-pine, Neodiprion sp.

Two species of Neodiprion sawflies were found on jack-pine; N. virginiana complex and N. maurus. Only N. virginiana complex occurred in large enough numbers to cause noticeable defoliation. Between Leaf River and Chemong, jack-pine regeneration was lightly defoliated with the occasional tree suffering up to 50 per cent loss of old foliage. Near Hudson Bay only the occasional colony of N. virginiana was observed and caused very little defoliation.

7.3.12 Midges on Jack-pine, Cecidomyia sp.

Scattered collections of this midge were made in widely separated jack-pine stands but populations were low. In the Torch River Provincial Forest, counts indicated two to three per cent of the current tips were infested. In the Porcupine and Northern provincial forests only the occasional tip on jack-pine regeneration was damaged.

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

The gray willow-leaf beetle was common throughout the district but heavy skeletonization of willow was confined to only a few relatively small areas (Map 4).

Near the north boundary of the Greenwater Lake Provincial Park heavy damage was observed over an area of approximately 3 acres. Pockets of moderate to heavy skeletonization were recorded between Saginas and Peepaw lakes in the Porcupine Provincial Forest. In the northern regions moderate browning of willow foliage occurred along the north shore of the Carrot River in the Goose Lake area. Elsewhere in the district only small numbers of this insect were observed.

7.3.14 Aphid sp.

Moderate to heavy aphid populations were observed on most tree species in the district particularly on open growing spruce and jack-pine but no noticeable damage was recorded.

7.3.15 Other Noteworthy Insects

Other noteworthy species that were collected in the Hudson Bay District are listed in Table 5.

Table 5

Other Noteworthy Insects

Insect species	No. of samples	Host tree	Remarks
Epinotia nisella criddleana	44	tA	Common in all tA stands
Oporphtera bruceata	20	tA	Light populations on tA
Petrova albicapitana	13	jP	Low numbers on jP regeneration
Toumeyella numismaticum	9	jP	Light scattered populations in northern areas
Chermes abietis	9	wS	Lightly scattered throughout district
Orsodacne atra	8	tA wB	Low populations on deciduous hosts
Mordwilkoja vagabunda	7	tA	Low numbers of regeneration trembling aspen
Pandemis canadana	7	tA	Scattered light populations
Sciaphila duplex	6	tA	Small numbers in most aspen stands
Archips rosaceana	5	tA	Low populations on tA stands
Zeiraphera fortunana	5	wS	Light scattered populations
Pikonema dimmockii	3	wS	Small numbers found on shelterbelts
Archips cerasivorana	5	cCh	Common on roadside shrubs
Tetralopha asperatella	7	tA	Scattered light populations in aspen stands
Aphrophora sp.	3	jP	Moderate populations in White Fox Tower area
Dimorphopteryx pinguis	3	wB	Found on birch in Madge Lake area

7.3.16 Collections from Permanent Sample Plots and Stations

Frequency of occurrence studies based on the standard five tree beating sample were carried out at permanent plots and sampling stations throughout the Hudson Bay district in 1958. Results of this survey are shown in Table 6.

Table 6

Collections of Major Species from Permanent Sample Plots and Stations in the Hudson Bay District 1958

Insect species	No. stations and plots sampled	Sample numbers	No. samples containing larvae	Av. no of larvae per tree sampled
Choristoneura conflictana	9	W0305 W0392 W0439 W0445 W0476 W0525 W0630 W0930 W0955 W3097	11	1.0
Gonioctena americana	9	W0500 W0952 W0630	3	22.3
Epinotia nisella	9	W0392 W0930	2	1.5
Archips rosaceana	9	W0305 W0952	2	1.
Zeiraphera ratzeburgiana	2	W1051 W1019	2	1.
Zeiraphera fortunana	2	W1051	1	1.
Choristoneura fumiferana	1	W1019	1	1.
Pristiphora erichsonii	9	W1606 W2111 W2114 W2222 W2270 W2288 W2290 W2310	8	3.5

7.4 TREE DISEASE CONDITIONS

7.4.1 Canker on Poplar, Cytospora chrysosperma

A Russian poplar shelterbelt on the farm of C. Baragar 4 miles north of Foam Lake was heavily infected with Cytopora chrysosperma. Cankers appeared on main stems and branches of all trees. Many tree tops and branches previously weakened by cankers were broken off by high winds which were common in the agricultural areas of the district during the spring season.

7.4.2 Rust on Jack-pine, Coleosporium solidaginis

Several collections of this disease were taken this season in the northern portion of the district. Heaviest infections were observed in jack-pine regeneration stands south of Hudson Bay and in the Torch River Provincial

Forest. Scattered areas of light infection were observed along The Pas Trail between the Overflowing River and Otosquen.

7.4.3 Needle Rust of Balsam Fir, Melampsora abieti-capraearum

Balsam fir understory on a small area in tp. 53, rge. 1, W. 2 supporting a mixed stand of white spruce, trembling aspen and birch was lightly infected by Melampsora abieti-capraearum. Balsam fir of reproduction and sapling size were moderately attacked while trees 4 to 7 inches d.b.h. showed only the occasional needle infected. Light mortality of reproduction balsam fir was evident throughout the stand although it is not know if Melampsora abieti-capraearum rust was the sole cause.

7.4.4 Fomes pinicola, the Cause of Brown Cubical Rot

This fungus, which is a destroyer of dead coniferous timber, was commonly found throughout the Porcupine and Northern provincial forests. Numerous conks were observed in an overmature stand of mixed spruce and trembling aspen in tp. 51, rge. 1, W. 2 in the vicinity of Chemong.

7.4.5 Spruce Mistletoe, Arceuthobium pusillum

A small area of mistletoe infected black and white spruce occurred in tp. 51, rge. 1, W. 2 north of Hudson Bay. Cutting operations conducted during the winter of 1957-1958 resulted in the removal of all merchantable spruce in this area and the remaining trees ranging in size from 3 to 9 inches d.b.h. were lightly infected but no mortality was evident to date.

7.4.6 White-Pocket Rot, Polyporus tomentosus

Specimens of this disease were taken at widely separated points throughout the district. In the Northern Provincial Forest along the Flin Flon Highway in tp. 54, rge. 10, W. 2, a mature spruce stand was heavily infested with this butt and root rot. Infected trees ranged from 4 to 12 inches d.b.h. and examination of the root systems of 5 dead standing trees showed that the majority of them were decayed or decomposed by the white-pocket rot fungus.

In the Porcupine Provincial Forest (tp. 42, rge. 3, W.2) the root systems of 5 dead standing trees examined showed only one tree infected with P. tomentosus. An examination of a recently windthrown white spruce in this area showed moderate damage to the root system by this fungus. Data recorded during this survey is shown in the accompanying table, Table 7.

7.4.7 Trunk Rot of Aspen, Radulum casearium

This disease of trembling aspen was observed at widely separated points throughout the district. It appeared to be fairly common in mature and overmature aspen stands particularly where windfallen timber is found.

7.4.8 Frost Damage

Frost damage, in varying degrees affecting many tree species, was recorded in the Hudson Bay district this season.

Table 7

Data Recorded During Survey For Occurrence of White-Pocket Rot, P. tomentosus
Hudson Bay District of Saskatchewan 1958

Location	Size of plot (acre)	Av. tree height	Av. age of stand	No. of trees examined	No. of patches per acre	No. of groups per acre	No. of single trees per acre	No. of healthy roots	No. of decayed roots	No. of decomposed roots	No. root samples with P. tomentosus	No. root samples with A. mellea	No. root samples with unknown
H.B. 1 sec. 15, tp. 42, rge. 3, W.2mer.	1	67.3	90	5	1	1	12	0	43	8	2	0	0
H.B. 2 tp. 54, rge. 10 W.2mer.	1	58.8	85	5	0	2	8	0	49	10	6	0	0

A young white spruce plantation in the Northern Provincial Forest in tp. 46, rge. 4, W. 2, suffered upwards of 50 per cent loss of new shoots. These trees ranged in height from 2 to 4 feet and were planted in semi-open country on an old burn. Immediately to the west of this plantation white spruce reproduction coming in under a canopy of trembling aspen suffered the loss of only an occasional bud.

In the Porcupine Provincial Forest, 3 miles south of Peepaw Lake, white spruce regeneration 2 to 3 inches d.b.h. and 6 to 12 feet tall were also damaged by frost. Approximately 40 per cent of the new shoots eventually dried up and dropped off.

Poplar and tamarack stands north of Hudson Bay suffered varying degrees of shoot and bud damage by frost.

Scattered areas of trembling aspen in the aspen grove region were lightly damaged. Frost occurred in scattered areas of the northern section of the district during the nights of June 21 to 23 inclusive.

7.4.9 Winter Drying

During the spring and early summer foliage browning of balsam fir followed by needle drop was observed in several locations in the Northern Provincial Forest. In tp. 53, rge. 1, W.2 mer. reproduction and sapling size balsam were lightly damaged. This area previously supported a good stand of white spruce which had been logged off leaving only overmature white and black poplar and reproduction balsam. It is thought that the sudden change in conditions due to opening of the canopy together with the mild winter and light layer of snow all contributed to this condition on balsam fir.

Throughout the remainder of the district little or no winter drying was recorded.

7.5 SPECIAL PROJECTS

7.5.1 Mass Collections

Several collections of insect material which were required for special projects being conducted by the Winnipeg Laboratory were collected in the Hudson Bay district in 1958. The purpose and type of collections are shown in Table 8.

Table 8

Summary of Special Collections Taken in the Hudson Bay District 1958

Type of collection and for whom collected	No. of collections	Days spent making collections (inc. travel)
Large aspen tortrix, Winnipeg Lab.	4	3
Neodiprion sawfly on jack-pine	9	1
Aphids for G. Bradley	17	2
Balsam fir sawfly, Winnipeg Lab.	2	1/2

7.5.2 Phenological Studies

Phenological measurements were again taken at the various plots in the Hudson Bay district. The first measurements were taken between June 5 and 15 when growth was approximately 25 per cent complete. A final measurement was made when terminal growth was completed.

7.6 SUMMARY OF INSECT AND TREE DISEASE COLLECTIONS

Table 9 contains a summary of insect and tree disease collections taken from host trees in the Hudson Bay district in 1958.

Table 9

Host tree	No. of insect samples	No. of disease samples
White spruce	59	3
Jack-pine	42	3
Tamarack	55	0
Trembling aspen	121	8
White birch	11	0
Balsam fir	2	2
Black spruce	9	1
Black poplar	3	0
Manitoba maple	8	0
White elm	2	0
Miscellaneous	47	2
Totals	359	19

8. ANNUAL REPORT OF FOREST BIOLOGY RANGER PRINCE ALBERT DISTRICT OF SASKATCHEWAN

1958

by

J. A. Drouin

INTERIM REPORT 1958

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

March 1959

8.1 INTRODUCTION

Surveys of forest insects and tree diseases were carried out in the Prince Albert District from May 5 to mid-September, 1958. They consisted of assessing insect populations and damage caused by major and minor insects and tree diseases. Several special projects including phenological measurements and P. tomentosus survey for disease were continued or undertaken in 1958.

A total of 493 insect and 30 tree disease samples were submitted to the Winnipeg and Saskatoon laboratories. Aerial surveys involving 11 hours of flying, which facilitated sampling and mapping of inaccessible areas, was provided by the Department of Natural Resources. The writer gratefully acknowledges the assistance given by the provincial personnel and private co-operators during the 1958 season.

8.2 REVIEW OF FOREST INSECT AND TREE DISEASES

Notable changes in the status of some of the major insect species occurred in 1958. Populations of the larch sawfly remained at low levels. There was a marked increase in distribution and abundance of the forest tent caterpillar in the majority of trembling aspen stands examined. The large aspen tortrix infestation recorded in 1957 extended northwest from the West-Central area to the aspen grove section around the North Saskatchewan River and Prince Albert areas.

Heavy parasitism further decreased jack-pine budworm populations. This also applies to Neodiprion sawflies attacking jack-pine. Extensive surveys were conducted on a stand opening disease of spruce caused by a root and butt-rot fungus, Polyporus tomentosus. No appreciable change occurred in the degree of rust infection by Chrysomyxa. Damage was light in all spruce stands.

8.3 INSECT CONDITIONS

8.3.1 Larch Sawfly, Pristiphora erichsonii (Htg.)

Populations of the larch sawfly continued at low levels in the Prince Albert District in 1958. Ground and aerial surveys completed in the latter part of the season showed a trace to light defoliation with occassional scattered groups of trees moderately defoliated in the northwestern section of the district. An early spring and continued dry weather during the summer may have had some controlling influence on sawfly populations. Water levels in all stands affected had receded to a considerable extent in 1957 and further below normal precipitation in 1958 dried the majority of tamarack stands.

Foliage production surveys conducted in the permanent sample plots showed a notable increase in shoot, foliage and cone production.

Light defoliation was recorded through the entire Nisbet, Fort a la Corne, Candle Lake, and extending east to Sandy Lake and Torch River Provincial Forest. West of Prince Albert to Shell Lake and north to Big River and the Prince Albert National Park boundary defoliation was very light. Small scattered moderate infestations were observed in the Dore - Smoothstone lakes

area. The remainder of the northwest section remained light.

Heavy mortality in tamarack stands caused by repeated flooding was recorded at Dore Lake along East Bay, southwest of Sled Lake and at the extreme north end of Cowan Lake. Heavy mortality also occurred in the Torch River Provincial Forest north of Snowden.

Egg populations sampling of the larch sawfly was carried out at six permanent sample plots. 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 1958

Plot no.	Location	Sec.	Tp.	Rge.	Mer.	No. shoots examined	No. shoots curled	Rating 1958	Rating 1957
104	Railroad Bog	8	49	26	W.2	80	3	L	L
114	Red Rock Blk.	19	49	25	W.2	60	0	L	L
113	Holbein	13	49	2	W.3	170	11	L	L
102	Crutwell	27	49	1	W.3	90	4	L	L
112	MacDowall	21	46	1	W.3	80	3	L	L
112	Dumble	28	55	7	W.3	210	15	L	L

Procedures for mass collections of larch sawfly cocoons were revised in 1958 to the larval drop tray technique.

Parasites and disease organisms were common in many areas. Parasitism by Dipterous and Hymenopterous parasites was recorded in the Red Rock Block, Crutwell, Leoville and at Otter Creek in the Big River Provincial Forest.

Results of cocoon counts and dissections from the larval drop trays are shown in Table 2.

8.3.2 Forest Tent Caterpillar, Malacosoma disstria Hbn.

This species was found in most aspen stands examined in 1958. The distribution of collections which usually consisted of single larva or scattered clusters of larvae is shown in Figure 2. This species was usually found in association with high populations of the large aspen tortrix.

An egg band survey was conducted in the latter part of August. The objects of the survey were to determine the areas likely to be infested, intensity of attack and boundaries of probably infestations for 1959. Three trees were selected at random, felled and examined for egg bands. The average egg band counts recorded per tree are shown at sample points in Table 3.

Table 2

Cocoon Counts and Dissections of Larch Sawfly from 20 Larval Drop Trays at Two Areas in the Prince Albert District 1958

Plot no.	Location	No. of trays	No. of cocoons collected	Av. no. cocoons per tray	No. of cocoons destroyed by small mammals	No. of cocoons destroyed by fall Bessa emergence	No. of cocoons examined	No. of larvae containing Mesoleius egg	No. of larvae containing Mesoleius larva	Per cent effective parasitism based on sound larvae B. harveyi	Per cent effective parasitism based on sound larvae M. tenthredinis	Per cent effective parasitism based on sound larvae T. klugii	Per cent larvae diseased
114	Red Rock	20	720	36.0	24	82	200	7	7	42.6	3.9	0	12.0
102	Crutwell	20	456	22.8	10	2	200	7	17	40.5	9.0	0	7.5

Summary of Forest Tent Caterpillar Egg Band Counts Based on Three Trembling Aspen Trees examined Prince Albert District 1958

Place	Location Sec.	Tp.	Rge.	Mer.	Average d.b.h	ht.	No. egg bands	Av. no. of eggs	Per cent hatch	diseased eggs	parasitism	unemerged larvae
Christopher Lk.	1 34	51	26	W.2	2.6	16.6	0	-	-	-	-	-
Christopher Lk.	2 28	52	26	W.2	3.1	24.0	8	153.8	95.4	1.9	1.6	1.1
Christopher Lk.	3 10	53	27	W.2	4.0	23.3	17	163.4	0	8.4	0	91.4
Christopher Lk.	4 18	53	28	W.2	2.8	26.6	0	-	-	-	-	-
Red Rock Blk.	1 24	49	26	W.2	3.8	25.6	1	204.0	90.8	.5	8.2	.5
Red Rock Blk.	2 6	50	24	W.2	5.3	36.0	0	-	-	-	-	-
Steep Creek	1 11	49	24	W.2	4.0	28.3	7	158.2	100	0	0	0
Steep Creek	2 29	48	23	W.2	2.0	20.0	0	-	-	-	-	-
Steep Creek	29	48	23	W.2	2.3	21.6	0	-	-	-	-	-
Ft. a la Corne	1 6	50	19	W.2	3.0	20.0	0	-	-	-	-	-
Ft. a la Corne	2 11	50	19	W.2	3.3	25.0	0	-	-	-	-	-
Ft. a la Corne	3 23	50	18	W.2	5.0	36.6	0	-	-	-	-	-
Christie Lake	22	49	26	W.2	3.6	28.3	0	-	-	-	-	-
Red Deer Hills	19	46	26	W.2	3.3	21.3	0	-	-	-	-	-
MacDowall	1 12	46	1	W.3	3.3	23.0	0	-	-	-	-	-
MacDowall	2 21	46	1	W.3	3.0	30.0	0	-	-	-	-	-
MacDowall	3 31	46	1	W.3	3.3	31.7	0	-	-	-	-	-
MacDowall	4 26	46	1	W.3	4.0	35.0	0	-	-	-	-	-
Duck Lake	19	44	1	W.3	2.7	18.0	0	-	-	-	-	-
P. A. West	10	49	27	W.2	3.7	29.0	0	-	-	-	-	-
Home Blk. West	29	49	1	W.3	3.0	20.0	0	-	-	-	-	-

8.3.3 Large Aspen Tortrix, Choristoneura conflictana Wlk.

The distribution and abundance of this species increased considerably in 1958. Light to severe defoliation was recorded over a large portion of the district (Fig. 3).

Moderate to severe defoliation was recorded in trembling aspen stands covering approximately 1600 square miles from Duck Lake in the south to Prince Albert in the north. Severe defoliation extended from Prince Albert east to the Steep Creek Block. Moderate to severe "pockets" of defoliation also occurred in the Fort a la Corne Provincial Forest and along the Torch River to Nipawin. Similar areas were also recorded at Christopher Lake and through the Candle, Whiteswan lakes area.

Throughout the remainder of the district this species was prevalent in most of the trembling aspen stands examined. Defoliation in most cases was light. Forest tent caterpillar, the leaf rollers and poplar leaf beetles were found at all the areas mentioned and contributed in some degree to defoliation intensity.

Light refoliation on the heavily defoliated areas was recorded in August at MacDowall, Red Deer Hills and Christopher Lake areas. Heavy larval and pupal parasites, mainly Hymenoptera and Diptera spp. were recorded at MacDowall and Christopher Lake. Very few diseased larvae were found. Predation by several avian species was recorded at Red Deer Hills and Christopher Lake.

8.3.4 Jack-pine Budworm, Choristoneurs pinus Free.

A further decrease in the populations of this species was recorded in 1958. Very light defoliation occurred in the Home Block. Mass collections of larvae made in the Home Block area showed up to 75 per cent parasitism of the larvae. This could be one of the major control factors in this area.

8.3.5 A Sawfly, Xyelid sp.

An extensive survey undertaken in 1957 to determine distribution of this insect was continued. The damaging effect caused by this species on jack-pine terminals was studied in 1958.

Attempts to obtain adults of Xyelid sp. under laboratory conditions unfortunately were not successful. The larva of this sawfly bores in the pith of the current terminal shoots of jack-pine. This activity stimulates the formation of a gall (Fig. 8). Swellings on the terminals were evident by May 26. By June 2 galls had increased in size and number.

On June 10, 312 jack-pine gall infected terminals were collected in the Buckland plantation. These were planted in screened cages containing fine, screened, moistened sand. Five galls occurring in their natural state were tagged as a reference point. On June 19 the first Xyelid sp. larval emergence was recorded on a check gall and 6 emergences were also recorded within the screened cages. (Fig. 9).

At completion of larval drop, one screen cage containing 170 terminals was examined to determine numbers of emerged Xyelid sp; a parasite of Xyelid sp, Habrocytus sp.; and a chalcid Eurytoma juniperina which also produces galls in jack-pine terminals. The jack-pine terminals planted in the screen cages were cut at ground level, so as not to disturb the moist sand in the screen cages. These terminals were dissected and examined. Results of dissections are shown in Table 4.

Table 4

Dissections of 170 Jack-pine Terminals from Larval Drop Trays Infested by Gall Forming Species

Eurytoma juniperina	Xyelid parasite Habrocytus sp.	Xyelid sp. emerged	Xyelid sp. unemerged living	Xyelid sp. unemerged dead	Unknown
33	43	52	7	1	34

Both screened cages will remain in the field to simulate natural conditions and in an effort to obtain adult emergences in the spring for positive determination.

Surveys in 1956 and 1957 revelaed that a chalcid, Eurytoma juniperina in the same locations under similar conditions produced a similar gall on jack-pine reproduction. A study area was established at the Prince Albert field station to obtain information on how to distinguish the two species in the field and to study seasonal development of E. juniperina.

Table 5

Gall Studies on Regeneration Jack-pine

Av. tree height ft.	Av. length of gall in m.m.	Av. width of gall in m.m.	Av. length of infested twig in m.m.	Av. length of check twig in m.m.
5.2	16.5	5.9	54.9	68.7

At completion of larval emergence the galls were dissected and examined. Of the 10 galls, 6 contained Xyelid sp. and the remaining 4 Eurytoma juniperina. Galls were generally located on the apical end of the mid or lower crown. Data on texture of galls showed no significant differences between Eurytoma sp. and Xyelid sp. In the advanced stages of Xyelid sp. galls were found to be resilient. Colour records of the ten infested galls were very similar, varying pale green to yellow in both species.

8.3.6 Balsam Gall Midge, Itonida balsamicola (Lint.)

Larvae of this species produces subglobular, basal swellings of about 3 m.m. diameter at the bases of the leaves of balsam-fir foliage. A survey was conducted in early August to determine the extent and intensity of damage in balsam growing areas and to obtain records of past history of its presence.

Open growing balsam-fir ranging 6 to 20 feet high were the main stand requirements. Five plots of 4 trees each were examined at the following three points: Big River - Cowan Lake; Sled Lake; Waskesiu Lake - Hanging Hearts Road.

The "quarter" method was used to select trees from which 4 branches were selected from the cardinal directions. On each branch 10 current apical twigs were examined and the number of infested twigs recorded. An estimate of damage was then recorded for 10 two and three year old internodes respectively.

Results of the 3 areas examined, balsam gall midge damage fell into trace category only. Slightly heavier damage was noted at Waskesiu Lake along the Hanging-Hearts Road.

8.3.7 The Poplar Borer, Saperda calcarata Say.

This species continued to cause light to medium mortality in stagnate trembling aspen stands in the district.

A combination of Saperda sp., Cossid sp. and flat headed borers were causing some medium mortality in the Home, Holbein, MacDowall and Canwood blocks of the Nisbet Provincial Forest.

Medium damage occurred in woodlots and shelterbelts examined at scattered points in the agricultural areas. In an effort to determine degree of damage, yearly spread and degree of mortality, a 1/2 by 5 chain trembling aspen permanent sample plot was established. The plot is located 4 miles west of Prince Albert. The plot was gridded into 6 - 1/2 x 1 chain, sub plots with established boundaries for future reference. All attacked and dead trees were tagged and examined for Saperda sp. and disease damage. The plot tally for 1958 is shown in the following table.

Table 6

Tally of Dead and Living Trembling aspen in a Six Grid Plot with Records on the Occurrence of Saperda sp. and Disease Damage 1958

Grid	No. of trees	No. living trees showing damage			No. dead trees showing damage		
		Saperda	Hypoxylon	Fomes	Saperda	Hypoxylon	Fomes
1	3	1			1	1	
2	4	1				1	1
3	5						
4	20	18				1	
5	12	12					
6	6	4			1		

These results indicate that the highest incidence of Saperda damage occurs in sub plots with high tree density. The plot will be retallied each year for continued records on spread of Saperda damage and stand deterioration.

8.3.8 Root Collar Borers on Trembling Aspen

A survey of borers occurring in the root collars of trembling aspen and balsam poplar showed widespread distribution of this condition in the Prince Albert District.

On both trembling aspen and balsam poplar, borer damaged trees were readily identified by a bulbous scarred appearance at the root collar (Fig. 10). Examination in most cases revelaed emergence holes, feeding galleries and frass around the base of the root collars. Flat headed borer, Buprestid sp., emergence holes occurred at ground level and up to 6 inches along the stem while round-headed borers were emerging mostly at or slightly below ground level.

A study plot for root collar borers was established 11 miles west of Prince Albert in the Home Block. The area supports mainly open growing jack-pine and small stands of stagnate trembling aspen up to 10 feet in height. Soil conditions are dry and sandy.

Twenty conical screen cages (Fig. 11) were placed around root collars in an effort to collect adult material for identification. The cages were checked at periodic intervals throughout the summer but no emergences had been recorded up to September 15.

The carpenter moth, Cossid sp., was found in galleries varying in length from 2 to 5 inches along the main root system. Up to 80 per cent of the root systems examined at the study plot had been damaged by this species. Emergence holes of the round-headed borers which occurred at or slightly below ground level appeared to encourage carpenter ant infestation and disease infection.

Diseased specimens were forwarded to Saskatoon for identification.

8.3.9 Neodiprion spp. on Conifers - Neodiprion abietis.-

Very light defoliation of old foliage of white spruce was recorded at Crutwell and Candle Lake.

Neodiprion virginiana.-

Surveys in the jack-pine stands of the Prince Albert District showed a decrease in populations in 1958. Egg scars of this species were first recorded on May 26 at Crutwell Corner and larval hatch on June 12.

Local outbreaks were still active at Christie Lake and Crutwell but defoliation to old foliage had decreased considerably. Scattered pockets of light defoliation continued on both mature trees and reproduction of jack-pine in the MacDowall and Red Rock blocks of the Nisbet Provincial Forest. Heavy parasitism was recorded at Christie Lake and Crutwell. Larvae were observed in the field until September 4.

Neodiprion maurus.-

Several collections of this species were made in the Prince Albert area and north of Leoville in the Big River Provincial Forest. Parasites were also numerous at the Prince Albert collection point.

8.3.10 American Poplar Leaf Beetle, Gonioctena americana (Scheaff.)

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 damage to foliage was observed at Christie Lake, Home, MacDowall and Canwood blocks and Duck Lake areas. At MacDowall defoliation was fairly extensive throughout the reproduction occurring through the jack-pine cut over areas. Light scattered pockets of defoliation were observed in the Rosthern, Carlton areas and north of Prince Albert in the agricultural areas of Sutrgeon Valley, Foxford, Briarlea and Holbein.

To the north scattered populations occurred at Dore and Sled lakes and Big River. The first recorded emergences were noted on May 14.

8.3.11 Gray Willow-leaf Beetle, Galerucella decora Say.

A further decline of this leaf skeletonizer occurred in 1958. Severe skeletonization of willow occurred north of Sharpe's Lake in the Big River Provincial Forest extending south to the settlements at the south end of Cowan Lake. Pockets of medium defoliation were also recorded extending south from Big River to Dumble and at the extreme north end of Cowan Lake. At all other areas examined willow-leaf beetle populations were low and damage negligible.

8.3.12 White Pine Weevil, Pissodes strobi (Peck.)

Light damage to leaders of black and white spruce was prevalent in the Prince Albert District. A white pine weevil appraisal survey was conducted in August to determine degree of infestation. Damaged leaders were common on white spruce at Crutwell, Big River and the Dore Lake area. Black spruce leaders damaged by this species was noted in the Bodmin, Cowan Lake, Candle Lake, and Big River Provincial Forest areas.

8.3.13 White Pine Weevil, Pissodes poss. strobi

Light damage to jack-pine leaders was recorded in all the jack-pine reproduction stands examined. Concentration of damage by this species occurred in the Buckland plantation where some 20 per cent of the plantings were infested by a weevil similar to Pissodes strobi Peck. This species is biologically different in that only one larvae is found in each attacked leader. The larva bores upwards in the new leader from the region of the first whorl. The gallery follows a relatively straight path in the cambium up to the base of the apical buds where it forms a pupal cell. Leaders attacked by this species have little tendency to curl. Similar weevil damage in white or black spruce causes the leader to wither and curl by mid-September.

Mass collections of jack-pine leaders were made at the Buckland plantation and shipped to Winnipeg for rearing and adult emergence studies. Adult emergences were forwarded to systematics for positive identification. Seconday attacks by a bark beetle Scolytid sp. were observed in numerous instances. A hymenopterous parasite on this species of weevil was observed during mass rearings in the laboratory and during field examination.

8.3.14 Birch Leaf Skeletonizer, Bucculatrix canadensisella Chamb.

Populations of this species were generally light causing light damage in most areas that it occurred in the district. Medium skeletonization was noted on white and swamp birch in the Crutwell and Christie Lake sections. Light defoliation occurred in the Red Rock and Home blocks of the Nisbet Provincial Forest.

8.3.15 A Tent Caterpillar, Malacosoma lutescens N. & D.

Tents caused by this species were common on chokecherry in most parts of the district. Numerous "tents" were found at Christie Lake, in the Garthland Ferry area and along the west boundary of the MacDowall Block. Heavy parasitism

was recorded at Christie Lake.

8.3.16 Pitch Nodule Maker, Petrova albicapitana Busck.

No change in distribution or populations were noted in 1958. A heavy adult emergence year was recorded and first year nodules on jack-pine terminals were numerous in all stands examined.

8.3.17 Jack-pine Midge, Cecidomyia spp.

Special collections of jack-pine midge were made at scattered points in the district to determine abundance. Samples of 100, 1957 shoots were taken in early June and examined for number of shoots infested. Results of special collections of jack-pine midge are shown in Table 7.

Table 7

Location	1957 Shoots	No. infested
4 miles west of Prince Albert	100	4
Buckland	100	9

8.3.18 A Root Weevil, Hylobius sp.

A survey of root damage and tree mortality caused by this weevil was conducted in conjunction with a survey to determine the incidence of the root rot fungus, Polyporus tomentosus. Procedures are outlined under stand opening disease of spruce in the tree disease conditions of this report. The survey of white spruce stands was conducted in 3 areas at Candle Lake and one at Cowan Lake. Weevil damage to the roots of white spruce was appraised by the critical examination of the root systems of 5 living and 5 dead sample trees.

A damage index (Warren, 1956*) for infested white spruce was applied to each root system. Results of the damage index are shown in Table 8.

Table 8

Hylobius sp. Damage Index Average at Four Study Plots on 5 Living and 5 Dead Trees in the Prince Albert District

Location	Average d.b.h.		Average height		Damage index		Av. percentage of roots diseased on living trees	Av. percentage of diseased roots with insect damage on living trees
	Living	Dead	Living	Dead	Living	Dead		
Candle Lk. 1	5.3	4.8	46.0	44.0	.4	1.1	1.2	1.2
Candle Lk. 2	5.5	5.4	51.0	38.1	.5	3.8	4.0	4.0
Candle Lk. 3	7.0	4.5	66.0	36.6	3.1	2.8	20.0	20.0
Cowan Lk.	9.8	12.8	81.0	84.0	1.5	1.9	2.2	1.2

* Warren, G. L. 1956. The effect of some site factors on the abundance of Hypomolyx piceus. Ecology 37(1): 132 - 139.

8.3.19 A Sawfly, Pleroneura borealis (Felt.)

Light to medium mortality of new shoots caused by this sawfly was observed 23 miles north of Big River. Populations were heaviest on reproduction balsam fir. Insect attack together with frost damage earlier in the spring caused up to 80 per cent shoot mortality. High populations were confined to a relatively small area approximately one half acre. Balsam fir stands in the remainder of the district showed very light populations of P. borealis.

8.3.20 A Pine Scale, Toumeyella numismaticum

A small pocket of moderately infested jack-pine occurred on the east side of the Steep Creek Block. Scale attack varied from light on mature trees to severe on reproduction. Scale populations remained light throughout the remainder of the district.

8.3.21 A Wood Borer, Oberea schaumi Lec.

Reproduction trembling aspen on poor sites was subject to damage from this species. Damage to the stem was general in most trembling aspen stands examined particularly in the sandy soil areas of the Nisbet Provincial Forest. No tree mortality could be directly attributed to this species.

8.3.22 Spittle Bug, Aphrophora sp.

Populations of the spittle bugs declined in 1958, except in the Buckland plantation and at two other points in the Home Block where heavy damage was found on jack-pine reproduction.

8.3.23 Other Noteworthy Insects

The following table contains a list of other insects which occurred commonly throughout the district causing light scattered defoliation or damage.

Table 9

Insects	Location	Host(s)	Remarks
Acleris variana	Home Blocks	wS, bS	Scattered, no defoliation
Pikonema alaskensis	Candle Lake		
	Fort a la Corne	wS, bS	Very light, no defoliation
Proteoteras willingana	Cookson-MacDowall	mM	Very light, general.
Lithocolletis salicifoliella	Big River Home Block	tA	Light - scattered
Toumeyella numismaticum	Home and Red Rock blocks	jP	Light - scattered
Archips cerasivorana	Prince Albert Dis.	cOh	Widely distributed
Dendroctonus simplex	Crutwell- Red Rock Block	tL	Attacks confined to dying tamarack
Laspeyresia youngana	Candle Lake - Dore Lake	wS	Occassional low populations

Insects	Location	Host(s)	Remarks
Tetralopha asperatella	Prince Albert Dis.	tA	Common, light to medium defoliation
Choristoneura fumiferana	Candle Lake	bF	Few - scattered
Neodiprion abietis	Crutwell, Candle Lk.	wS	Few - light defoliation
Herculia thymetusalis	Cookson, Red Rock Block	bS)	Medium populations general on all black spruce stands with compact crowns
Dioryctria abietella	Candle Lk., Torch River	bS)	
Archippus alberta	Dore, Sled Lks., Bodmin	bS)	
Recurvaria sp.	Emma Lake P.F.	bS)	
Meroptera pravella	Christopher Lk.	tA	Widely scattered, light
Cinara sp.	Prince Albert Dis.	all species	Common to heavy

8.4 TREE DISEASE CONDITIONS

8.4.1 Stand Opening Disease of Spruce

Killing of roots by the root and butt rot fungus, P. tomentosus, was found at 5 areas in the Prince Albert and Meadow Lake districts. This disease is apparently related to some soil conditions which inhibit downward root growth, leading to overcrowding. Eventually the trees die causing stand openings in spruce forests. A survey to detect incidence of this disease was conducted in the Northwestern Region in 1958.

Efforts were made to locate stands in which white or black spruce mortality was associated with poor sites. Cruise strips 10 chains long by 1 chain wide were examined for single, groups and patches of dying or dead trees. Counts were made on dominant and co-dominant trees only. Age and d.b.h. were recorded from one dominant tree of each species.

Five dead trees were selected and each main root examined 1 to 2 feet from the tree. Following are site classifications of the site examined.

Cowan Lake.-

The stand in this area was located in a low moist site and consisted of a mixture of overmature and mature white spruce, balsam fir and overmature trembling aspen ranging up to 24 inches d.b.h. and up to 120 feet in height. The approximate age of check borings ranged up to 160 years.

Ground cover was light with scattered cranberry, willow, alder, twinflower and a medium layer of moss.

Dense balsam fir regeneration occurred in most of the stand openings.

Three other sites were surveyed in the Candle Lake area. Two diseased roots from each tree sampled at the 4 plots examined were submitted to the Forest Pathology Laboratory at Saskatoon for further studies and identification. No sporophores of P. tomentosus were located during 1958.

Table 10 shows the data recorded during P. tomentosus surveys in the Prince Albert District in 1958.

8.4.2 Rust on Conifers, Chrysomyxa ap.

There was no appreciable change in the degree of rust infection by Chrysomyxa in 1958. Although the fungus was prevalent to some degree on all diameter classes examined, it occurred most abundantly on regeneration black spruce in shaded areas.

A Condition of Tamarack.-

The severe mortality caused by a complex of factors in the MacDowall Block in previous years was less evident in 1958. Examination of the permanent sample plot in the area showed no dying branches or trees. Light mortality continued in the Red Rock Block and Crutwell areas.

8.4.3 Canker of Poplar, Hypoxylon pruinatum

Dying and dead trembling aspen girdled by Hypoxylon cankers occurred in varying degrees of severity in most of the stands examined.

Root Rot and Stain on Trembling Aspen.-

Widespread occurrence of root rot and stain on borer attacked root collars of trembling aspen and balsam poplar was recorded in 1958. Heaviest damage was located on sandy soils supporting open growing trembling aspen of low vigor. These trees ranged from 1 to 3 inches in diameter at root collar, up to 30 years old, and from 4 to 6 feet high. As a result of severe attacks by a complex of borers the root collars are subject to heavy damage by root rot and stain.

Frost Damage.-

Severe frosts in late May and early June caused light to severe damage at scattered points in the Prince Albert District. The broadleaf tree species suffered the heaviest damage. Aerial surveys showed extensive areas of light with scattered medium damage to trembling aspen east of Big River, Cowan Lake and extending east to the Prince Albert National Park boundary. Medium damage was recorded on maple shelterbelts north of Prince Albert. Light scattered frost damage was noted on white spruce, balsam fir and tamarack in the Home Block and north of Big River.

8.4.4 Other Noteworthy Diseases

Other tree diseases, which occurred either commonly or occasionally in the district, but were causing very little damage are shown in Table 11.

Table 10

Data Recorded from P. tomentosus Survey
Prince Albert District of Saskatchewan 1958

Location	Size of plot (acre)	Av. tree height	Av. age of stand	No. of trees examined	No. of patches per acre	No. of groups per acre	No. of single trees per acre	No. of healthy roots	No. of decayed roots	No. of decomposed roots	No. of root samples with P. tomentosus	No. of root samples with A. mellea	No. of root samples with unknown
Candle Lk. 1	1	40.8		5	1	1	8	4	16	4	0	7	2
Candle Lk. 2	1	45.3		5	1	1	5	-	21	3	7	3	-
Candle Lk. 3	1	51.6		4	8	5	9	4	16	3	4	2	2
Cowan Lk.	1	80.5	112	5	1	1	17	5	29	3	3	4	3

Table 11

Other Noteworthy Diseases
Prince Albert District
1958

Host	Locality	Disease	Remarks
Balsam fir	Big River - Cowan Lake	Needle cast	Infection light
Willow	Crutwell - Big River - Sled Lake	Leaf rust	Scattered - light
Balsam poplar	Crutwell	Septoria leaf spot	Infection light
T. aspen	Otter Crk. - Home Blk.	Root rot and stain	General light - medium
Black spruce	Big River	Yellow witches' broom	Light - scattered
Black spruce	Cookson	Cone rust	Trace
Jack-pine mistletoe	Home Block	Seed blight	Common - light
Jack-pine	MacDowall Block	Armillaria root rot	Trace
Larch	Cookson	Larch canker	Common - light

8.5 SPECIAL PROJECTS

8.5.1 Special Collections

Special collections of insect or plant material were made in 1958. These collections were used for special studies or projects being conducted at Winnipeg and other laboratories. Type and purpose of these collections are shown in Table 12.

Table 12

Summary of Special Collections
Prince Albert District 1958

Type and Purpose of Collections	No. of collections	Total time on collections
Mass collections Xyelid sp. galls for H.R. Wong, Winnipeg Laboratory	2	2 days
Aphid collections for G. Bradley, Winnipeg Laboratory	32	Collected during field surveys
Tree discs for growth measurement studies V. Hildahl, Winnipeg Laboratory	4	2 days
Mass collection 300 jack-pine budworm larvae for R. J. Heron, Winnipeg Laboratory	1	2 days
Balsam gall midge survey for Dr. R.L. Giese Wisconsin	2	Collected during field surveys

Type and Purpose of Collections	No. of collections	Total time on collections
Special collections and counts of jack-pine midge for W.A. Reeks	3	Collected during field surveys
Collections of gall formers on jack-pine for H.R. Wong, Winnipeg Laboratory	20	Collected during field surveys

8.5.2 Phenological Studies

Detailed phenological records were again taken at the Christie Lake reference point. Measurements were continued on a twice weekly basis from May to September.

Light frost damage to white spruce buds, oviposition damage to larch shoots, and feeding damage on trembling aspen terminals reduced the number of terminals which could be used for acceptable measurements.

8.5.3 Permanent Sample Plots and Stations

Frequency of occurrence studies on all collections from permanent sample plots and stations were conducted in 1958. Number of samples containing larvae and pupae and the average per 5 tree beating sample is shown in Table 13.

Table 13

Summary of Collections of Major Insect Species from Permanent Sample Plots and Sampling Stations based on 5 tree Beating Samples

Insect species	No. of stations and plots sampled	Sample number(s)	No. of samples containing larvae and pupae	Av. no. of larvae and pupae per tree beating samples
Malacosoma disstria	2	W-0758,W-1348	2	.4
Large aspen tortrix	9	W-0522,W-0755, W-0627,W-0758, W-0027,W-0626, W-0637,W-0045, W-0625	9	1.2
Jack-pine budworm	1	W-1402	1	.2
Yellow-headed spruc sawfly	1	W-1589	1	.4
Xyelid	4	W-0509,W-0510, W-0520.W-0514	4	3.0
Phytodecta americana	5	W-0027,W-0045 W-0627,W-0758 W-0626	5	2.2
Badebecia urticana	1	W-0027	1	.2
Epinotia nisella criddleana	3	W-0758,W-0625 W-0047	3	.6
Campea pertata	1	W-0522	1	.2
Hyperaspis binotata	1	W-1616,W-1618	2	3.8

9. ANNUAL REPORT OF FOREST BIOLOGY RANGER MEADOW LAKE DISTRICT OF SASKATCHEWAN

1958

by

G. Lalor

INTERIM REPORT 1958

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

March 1959

9.1 INTRODUCTION

Surveys covering the Meadow Lake and portions of the Northern and West-Central districts were conducted by the writer from May to September 1958. A total of 316 insect and 12 tree disease samples were submitted to the Winnipeg and Saskatoon laboratories.

All permanent sampling stations were sampled during the field season and major insect outbreaks were mapped. The abundance of minor insect species was recorded.

Tree disease surveys were continued with special emphasis on the examination of spruce for presence of the white pocket-rot and the disease of spruce, Flammula alnicola. A limited survey was also conducted to determine the cause of tamarack mortality throughout the district.

Aerial surveys, involving 8 hours of flying, facilitated the mapping of insect infestations in inaccessible areas. The above mentioned flying time was provided by the Saskatchewan Department of Natural Resources. This and other forms of co-operation from personnel within the district is gratefully acknowledged.

9.2 REVIEW OF FOREST INSECT AND TREE DISEASES

Changes in the status of some insect species occurred in the Meadow Lake District in 1958. The yellow-headed spruce sawfly decreased noticeably in white spruce shelterbelts. The pitch-pine nodule maker, which in past years was relatively light, increased to some extent in the Bronson Provincial Forest. An increase in the incidence of white-pine weevil was apparent throughout the district. The larch sawfly remained generally light over most of the district, and the large aspen tortrix declined sharply in the Lloydminster area. The American poplar leaf beetle and some species of leaf rollers were present throughout the district but no appreciable change in their abundance was recorded. The boxelder twig borer remained very light. A sharp decrease in the amount of skeletonizing of willow by the gray willow leaf beetle was noted.

Armillaria mellea, a root rot of conifers, was prevalent in tamarack stands where tree mortality is occurring and infections of Polyporus tomentosus were recorded in spruce stands in the vicinity of Green Lake.

9.3 INSECT CONDITIONS

9.3.1 Larch Sawfly, Pristiphora erichsonii (Htg.)

No change in the status of this insect occurred in 1958. Defoliation of tamarack stands throughout the district was generally light. The distribution and infestation ratings of this species are shown in Fig. 1.

Shoot production, at most points of inspecition, was very poor on mature and immature pole trees. Sawfly populations, where they occurred, appeared to be concentrated on small reproduction tamarack which had an abundance of new shoots.

On well drained locations, such as occur at St. Cyr and Loon Lake Beach, shoot production on mature trees was fair and on reproduction very good. At these points light populations of the larch sawfly were distributed throughout the stands.

In the North Makwa area, moderate defoliation occurred on reproduction ranging up to three feet in height. At Ministikwan Lake an increase in the numbers of sawfly larvae occurred on reproduction causing moderate defoliation. Throughout the area, however, defoliation was generally very light. At Pierceland and Goodsoil defoliation was also, generally, light. Populations concentrated on reproduction, which fringes the mature stands, were causing moderate defoliation.

In the Waterhen, Jeanette and Flotten lakes areas, larch sawfly populations were very low and defoliation light. Similar conditions prevailed through the Meadow Lake Provincial Forest and in the Turtle Lake area.

Parasite and disease appraisal studies were continued in 2 permanent study plots in 1958. Techniques for collecting cocoons for dissections were modified for more refined estimates of the parasite Bessa harveyi in each plot in early July. After the larval drop period the cocoons were collected from the trays and shipped to Winnipeg for dissection during the winter. Cocoon populations were very low in both study plots in 1958.

Foliage production records and egg population sampling was continued in permanent sampling plots. The infestation ratings in the plots, based on the percentage of current tamarack shoots utilized for oviposition, are shown in Table 2.

Table 2

Population Estimates of the Larch Sawfly
(based on Sequential Sampling of Egg Populations)
Meadow Lake District 1958

Plot	Location					Results of Sampling		
	Place	Sec.	Tp.	Rge.	Mer.	Total shoots counted	Total shoots curled	Infestation rating
104	Pierceland	14	62	26	W.3	70	2	light
103	Loon Lake	16	59	22	W.3	120	3	light
105	Green Lake	10	61	14	W.3	80	3	light
101	Meadow Lake	15	55	17	W.3	60	1	light

9.3.2 Defoliators of Trembling Aspen

The leaf roller, Epinotia nisella criddleana, together with the large aspen tortrix, American poplar leaf beetle and several other species caused defoliation of trembling aspen throughout the district. These insects are discussed below in order of their relative abundance.

The first larvae of Epinotia nisella criddleana were observed on May 20 and feeding continued until about June 15. It was the main defoliator of trembling aspen and moderately defoliated pockets of aspen at Glaslyn, Loon Lake, Paradise Hill and Jeanette Lake.

The American poplar leaf beetle, although formed occassionally in the agricultural areas, was confined mainly to the more heavily forested areas in the northern portion of the district. In the northern regions, which include the areas surrounding Meadow Lake, St. Cyr, Green Lake, Dorintosh, Jeanette and Waterhen lakes and throughout the Bronson Provincial Forest, populations of this beetle increased over 1957. Damage was generally light but small pockets of severe defoliation were recorded at several points of inspection.

At St. Cyr trembling aspen reproduction was severely defoliated. This same condition occurred at several points between Dorintosh and Waterhen lakes. Small pockets of severe defoliation were also recorded at Pierceland.

At Beaver River Crossing on #26 highway, where damage was severe in 1957, a sharp decrease in populations occurred in 1958.

Collections of the large aspen tortrix were also made at most points of inspection. Small numbers were noted in all trembling aspen stands. In the area between Lloydminster and Marshall a decline in populations was noted in 1958 and defoliation was light. Infestation ratings for the district are shown in Fig. 3.

Other insects commonly found on trembling aspen were: the leaf rollers, Badebecia urticana, Pandemis canadana, Archips rosaceana, Archips negundana and Exartema appendiceum; the loopers, Orthoptera bruceata and Autographa sp.; the owlet moths, Gelechiid sp. and Ipimoipha pleonectusa and the leaf beetle, Orsodacne sp.

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

Surveys indicated a sharp decrease in the prevalence of this insect in the district.

In 1957 an increase in populations on white spruce shelterbelts in the Barthel area resulted in the destruction of 50 to 75 per cent of the current year's foliage. In 1958 several of the infested belts were sprayed and as a result, defoliation of these was negligible. At unsprayed locations in the Barthel area insect populations had also decreased sharply and defoliation did not exceed 20 per cent.

White spruce shelterbelts located in North Makwa, Morin Creek, Meadow Lake and Green Lake areas averaged approximately 25 per cent.

On native stands in the North Makwa and Ministikwan Lake areas, a noticeable decrease in the number of yellow-headed spruce sawfly occurred in 1958.

9.3.4 White-pine Weevil, Pissodes Strobi Peck.

A further increase in populations of this species was apparent in 1958.

Endemic populations, previously confined to the Meadow Lake Provincial Forest, increased noticeably with somewhat wider distribution in 1958.

At the Green Lake Experimental farm where 50 per cent terminal damage occurred in 1957, further damage to leaders was recorded in 1958.

North of Green Lake at the Waterhen River, scattered open-growing native white and black spruce in the 2 to 4 inch d.b.h. class had damaged terminals. In the Bronson Provincial Forest and in the North Makwa Lake area an increase in the number of terminals damaged was apparent in 1958.

A sample of this weevil was taken from the terminal of a fifteen year old white spruce tree near Pierceland. This was the first sample recorded from the area. Near Divide Tower in the Meadow Lake Provincial Forest, 40 per cent of native white and black spruce trees measuring up to 3 inches d.b.h. were damaged by white pine weevil. At Turtle Lake an estimated 30 per cent of open-growing mixed black and white spruce trees averaging 2 1/2 inches d.b.h. were damaged.

9.3.5 Boxelder Twig Borer, Proteoteras willingana Kearf.

The distribution of this species remained about the same as in 1957. The first larvae were collected on May 21 from a Manitoba maple shelterbelt near Spruce Lake. At that time very light twig mortality, resulting from the previous year's feeding, was apparent.

In the Edam and Paradise Hill areas damaged by twig borer was very light. North of those points damage was negligible. In 1957, population counts of the boxelder twig borer were made at several representative locations. These counts were repeated at the same locations in 1958. At each location five trees were selected for sampling. The percentage of twigs infested, based on examination of four branch samples from each of three crown levels of the sample trees, is shown in Table 4.

Table 4

Results of Special Sampling of Boxelder Twig Borer Populations
Meadow Lake District 1958

Place	Grid	No. of twigs examined	No. of twigs infested	Percentage twigs infested	
				1957	1958
Onion Lake	8-033-314	799	6	.9	.75
Edam	8-047-311	747	16	3.5	2.1
Loon Lake	8-041-325	894	0	0	0
North Makwa	8-042-327	1025	0	0	0
Goodsoil	8-048-328	987	2	0	.2
Glaslyn	8-049-310	502	0	0	0
Paradise Hill	8-039-316	823	15	.6	1.8

9.3.6 A Root Weevil, Hylobius sp.

Surveys were carried out at two locations in the Green Lake area to determine root damage and tree mortality caused by this species. The root system of 5 living and 5 dead white spruce were examined for root injury. A damage index was applied to each root system. The descriptions of the two study plots were as follows:

Plot 1. Green Lake:- Located on a gradual slope draining to a dense black spruce stand. The plot area supports a mixture of mature white spruce, trembling aspen and balsam poplar. Scattered white spruce, balsam and poplar deadfall occurred throughout the stand. Ground cover was composed of cranberry, ferms, grasses and Labrador tea. Soil conditions were moist to very moist with a heavy layer of moss and humus. The depth of the humus varied from 5 to 8 inches.

Plot 2. Green Lake:- Stand composition was about the same as at plot 1. Trees were generally smaller and the stand more dense. There were fewer mature trees present. There were also fewer deadfalls or evidence of mechanical damage. Ground cover was sparse, consisting of twin flower, Labrador tea and moss.

A summary of damage index for living and dead trees in the two plots is shown in Table 5.

Table 5

Hylobius sp. Damage Index Average at two Study Plots
on 5 living and 5 dead trees
Meadow Lake District 1958

Location	Average d.b.h.		Average height		Damage index		Av. per cent of diseased roots	
	living	dead	living	dead	living	dead	on living trees	with insect damage
Green Lake 1	9.6	10.8	85.0	85.0	3.38	3.0	49.6	44.6
Green Lake 2	6.2	6.2	70.0	67.0	1.7	2.5	20.0	20.0

9.3.7 The Bark Beetle, Dendroctonus simplex

During 1958 it was noted that this species was present in tamarack stands suffering heavy tree mortality. nCounts were made at three points in the district to determine the incidence of this bark beetle in living and dead trees. The result of this survey, which is based on the examination of 25 trees at each study point, is contained in the following table.

Of the 42 living trees examined, D. simplex was recovered from only one. Over 75 per cent of dead trees were infested by this bark beetle. This would indicate that the bark beetle is a secondary invader in tamarack.

Table 6

Examination of Living and Dead Tamarack at Three Study Areas for Dendroctonus simplex
Meadow Lake District 1958

Location	No. of trees examined	Average d.b.h.	Average height	No. of trees living	No. of trees that died 1958	No. of trees dead prior to 1958	No. of trees containing insects	
							living trees	dead trees
Pierceland	25	6	35	5	3	17	1	20
Divide Tower	25	4	15	16	0	9	0	2
Meadow Lake P.F.	25	3	15	21	0	4	0	3

9.3.8 Other Noteworthy Insects

The following table contains a list of insect which occurred commonly throughout the district causing light, scattered defoliation or damage.

Table 7

Other Noteworthy Insects

Insect	Location	Host	Remarks
Amphidasis cognataria	Glaslyn area	wB,mM	occasional larva
Archips rosaceana	Wide distribution	mM	very light defoliation
Archips negundana	General throughout	mM	very light damage
Badebecia urticana	Common in northern portion of district	wB,tA, bPo	light defoliation
Chermes abietis	General	wS	minor damage
Dioryctria abietella	General	wS	very light damage
Herculia thymetusalis	Common in club-top black spruce	bS	light damage
Malacosoma lutescens	Common in Bronson P.F.	cCh	confined to roadside shrubs
Pandemis canadana	General throughout	W,tA, bPo	common
Gracillaria negundella	Borintosh	mM	common

9.4 TREE DISEASE CONDITIONS

9.4.1 The White-Pocket Rot, Polyporus tomentosus

This disease of spruce, observed in various parts of Saskatchewan is suspected to be related to certain soil conditions which may impede downward development of roots. This leads to overcrowding of roots near the surface of the soil and subsequently to deterioration of the stand. The disease causes stand openings in patches of a few feet in diameter upwards. In these openings it appears that the trees have died slowly over a period of several years with the result that many are lying with the roots and butts completely rotted away while other dead trees are still standing. The surrounding stand frequently appears quite normal. The dead trees occur in small groups of two or three or more. Sporophores of P. tomentosus occur in moist seasons in August and September.

In order to obtain data where the disease occurs in the stands and the incidence of this disease, a special survey was conducted throughout the area in 1958. Two locations, in which black spruce or white spruce were a major component of stands, were selected. In the Meadow Lake districts, two stands--one five miles south of the town of Green Lake and another eight miles east--were selected for study. At both locations stands were composed of trembling aspen and white spruce, the latter of which ranged in age from sixty to eighty years.

At each location a 1 acre strip 10 chains long by 1 chain wide was cruised for tree mortality. The number of patches (4 or more trees), groups (2 to 3 trees) and single dead trees per acre was recorded. Only dominant and codominant trees were considered for the study. In each plot five dominant or codominant dead trees were sampled for the occurrence of the disease. Results of this survey are shown in Table 8.

Although sporophores were not found at both locations, diseased roots were common. Two diseased roots from each tree sampled at both plots were forwarded to the Forest Pathology Laboratory at Saskatoon for further study.

9.4.2 Frost Damage and Winter Drying

There was very little evidence of winter drying, drouth, or spring frosts through the district this year. A series of light frosts between June 17 and June 25 which caused damage to garden and field crops also caused some damage to broadleaf trees. Both birch and caragana, in some locations, were affected and premature leaf falling occurred. Patches of black and white poplar growing in the Cochin, Cater and Spiritwood areas have become dry and brown. Coniferous trees growing in the same area were only slightly affected.

9.4.3 Flammula alnicola

This mushroom is associated with root and butt decay in white and less commonly in black spruce. During the 1958 season white spruce stands throughout the district were inspected for signs of its presence. Although no mushrooms of this disease were found in white spruce stands during the 1958 season it is possible the disease might show up in root samples submitted.

Table 8

Data Recorded During Survey for Occurrence of White-Pocket Rot, **P.** tomentosus
Meadow Lake District of Saskatchewan 1958

Location	Size of plot (acre)	Av. tree height	Av. age of stand	No. of trees examined	No. of patches per acre	No. of groups per acre	No. of single trees per acre	No. of healthy roots	No. of decayed roots	No. of decomposed roots	No. root samples with P. tomentosus	No. root samples with A. mellea	No. root samples with unknown
Green Lake Plot 1	1	90	80	5	0	5	14	4	24	8	3	6	1
Green Lake Plot 2	1	65	60	5	1	3	12	0	22	5	7	5	0

9.4.4 Spruce Needle Rust, Chrysomyxa ledicola

Very light traces of this foliage disease of white spruce were apparent in shaded areas. Owing to the abnormally dry season infections were notably lighter than in previous years.

9.4.5 Jack-Pine Mistletoe, Arceuthobium americanum

No changes in the known boundaries of this parasitic plant were noted in 1958. Ground surveys conducted in the Northern District of Saskatchewan indicated heavy damage to jack-pine in the area between the Waterhen River and Beauval and in the Lac Isle and la Crosse area.

9.4.6 Canker of Poplar, Hypoxylon pruinatum

Dying and dead trembling aspen occurs in varying degrees of severity in most stands in the Meadow Lake, the eastern portion of the west central district and the Northern District of Saskatchewan. This disease is noticeably more severe in areas that have been grazed by cattle and where ground fires are prevalent.

9.4.7 A Leaf Blight, Linospora tetraspora

This leaf blight, which occurred in light to medium intensity in trembling aspen stands during 1957, was much lighter in 1958.

9.4.8 A Witches' Broom on Saskatoon, Apiosporina collinsii

This disease was found at several widely separated points in the Meadow Lake and Northern District of Saskatchewan. It is most common where growth is dense and shaded.

9.4.9 Armillaria Root Rot, Armillaria mellea

During 1957 it was observed that approximately 5 per cent of young jack-pine growing in the north Makwa Lake area measuring up to 6 feet in height and averaging 1 1/2 inches d.b.h. were dead as a result of a disease organism attacking their root systems. This disease has now been positively identified as Armillaria root rot.

9.4.10 Mortality of Tamarack

During the past several years considerable mortality of mature tamarack has been occurring in the Meadow Lake District of Saskatchewan. Following severe flooding in 1954, it has become more apparent each year. In 1955 tamarack showed very poor shoot and foliage production and many appeared to be dying. This condition has increased each year and at the present time many trees are dead.

The larch sawfly had been present in small numbers prior to 1954 but caused severe defoliation only during that year. While prolonged defoliation by the larch sawfly is, undoubtedly, a contributing factor to mortality of tamarack, the short duration of severe attack in the area would indicate that it had very little influence on the present condition of the trees. Prior to 1958 the flooding of swamps had been considered a major factor and probably the immediate cause of the mortality. It has, however, been since

noted that some mortality of tamarack is also occurring on well drained sites and therefore flooding may not be the primary cause. This is further supported by the fact that white birch growing in the immediate vicinity have shown no adverse effects from flooding.

Although the cause of this condition has not been established, it is suggested that it is probably due to a combination of factors including maturity, larch sawfly defoliation, abnormal moisture conditions, bark beetles and possible disease; the latter of which now appears to be an important factor.

During August of 1958 disease sampling of tamarack was carried out at Pierceland. Trees which had died during the 1958 season were felled and sections taken from the butts. Those, along with root samples, were submitted to the Forest Pathology Laboratory at Saskatoon where they are undergoing further study.

9.5 SPECIAL PROJECTS

9.5.1 Permanent Sample Plots and Stations

A survey of all permanent plots in the Meadow Lake District was conducted in 1957. As a result of the survey, two tamarack plots, one at Green Lake and another at Turtle Lake, were re-established in 1958. Young vigorous stands were selected for study and plots established measuring 1 x 1 chain. At each plot 10 trees were selected and tagged for a five year study of insect and disease damage.

Collections of major insect species at permanent sample plots and sampling stations, based on 5 tree beating samples are shown in Table 9.

Table 9

Collections of Major Species Collected from Permanent Sample Plots and Stations 1958

Insect species	No. of plots and stations sampled	Sample numbers	No. of samples containing larvae	Av. no. of larvae per tree sampled
Pristiphora erichsonii	3	W-2061, W-1661	2	1.4
Choristoneura conflictana	7	W-0079, W-0413 W-0412	1	.5
Epinotia nisella criddleana	7	W-0413, W-0412	3	1.1
Phytodecta americana	7	W-0079, W-0413	2	4.8

The percentage of tree loss by basal area in the two plots re-tallied are shown in Table 10.

Table 10

Summary of Two Permanent Tamarack Plots in Meadow Lake District of Saskatchewan showing Percentage Dead Trees by Basal area (Percentage Wood Loss being the Cumulative Mortality)

Plot No.	Location Sec.	Tp.	Rge.	Mer.	Year established	Years tallied	Basal area tamarack Living	Dead	% loss	Basal area total all species Living	Dead	% loss	Remarks
102	34	53	18	W.3	1949	1949	13.973	.508	3.51	14.543	2.398	14.16	light larch sawfly populations in 1953
						1956	10.419	1.728	15.22	11.208	1.733	13.39	severe flooding in 1954. Cattle grazing
						1958	6.389	4.833	43.07	7.296	4.833	39.84	
105	5	61	12	W.3	1951	1951	10.249	.215	2.06	10.357	.215	2.03	severe defoliation prior to 1954.
						1958	8.525	5.501	39.93	8.797	5.501	38.47	Severe flooding 1954

9.5.2 Phenological Studies

Phenological studies for the purpose of preparing a phenological map for the region were again conducted in the district.

9.5.3 Special Collections

Several special collections of insects and plant material were made in the district in 1958. This material was used for special studies and projects being conducted at Winnipeg and other laboratories. The type and purpose of these collections is shown in Table 11.

Table 11

Special Collections and Projects 1958

Type and Purpose of Collections	No. of collections	Total time of collections
Aphid collections for G. Bradley, Winnipeg	8	collected during field surveys
Studies on reproductive capacity of larch sawfly	30 trays	9 days
Trembling aspen tree discs for V. Hildahl Winnipeg Laboratory	1	1 day
Collections (black flies) for W. A. Reeks Winnipeg Laboratory	1	1/2 day
Collections of blasam cones for Saskatoon Lab.	1	1 day

9.5.5 Study of the Reproductive Capacity of the Larch Sawfly

Thirty larval drop trays were 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. 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 to study the changes in the reproductive capacity of the larch sawfly in relation to fluctuations in populations.

10. ANNUAL REPORT OF FOREST BIOLOGY RANGER NORTHERN DISTRICT OF SASKATCHEWAN

1958

by

B. B. McLeod

INTERIM REPORT 1958

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

March 1959

10.1 INTRODUCTION

Surveys for forest insects and tree diseases were carried out in the Northern District of Saskatchewan from May 5 to September 20, 1958. Part of the field season was spent conducting surveys in the eastern sections of the Prince Albert and West-Central districts.

A total of 502 insect samples and 26 tree disease samples were made. Aerial surveys in inaccessible areas of the Northern and Prince Albert districts were made by chater aircraft and co-operative arrangements with the Department of Natural Resources. The assistance of the personnel of the Department of Natural Resources in other field assignments in gratefully acknowledged.

10.2 REVIEW OF FOREST INSECT AND TREE DISEASES

Several noticeable changes occurred in the status of some major forest insects. An increase of larch sawfly populations in the south and continued severe defoliation in the northern areas was recorded. Increased black spruce recorded was noted in the yellow-headed spruce sawfly infestation at Wallaston Lake. The infestation of the large aspen tortrix recorded in 1958 in the Prince Albert District extended north into Prince Albert National Park. Forest tent caterpillar were frequently found together with this species in 1958. Severe skeletonization of willow by the willow leaf beetle and leaf miners was recorded in the Northern District.

The only noteworthy change in the status of tree diseases in 1958 was a further extension of the known northern boundary of jack-pine mistletoe and the fungus Wallrothiella arceuthobii.

10.3 INSECT CONDITIONS

10.3.1 Larch Sawfly, Pristiphora erichsonii Htg.

From 1956 a decline in the larch sawfly infestations in the south has been accompanied by a general increase in distribution and abundance in the north. This trend continued in 1958, but defoliation of tamarack was noticeably heavier than last year at a number of points south of the Churchill River. Infestation ratings at representative points in the district, based mainly on aerial defoliation estimates, accompanied by ground checks, are shown in the accompanying map (Fig. 1).

Larch sawfly cocoons were collected from permanent tamarack plots at Mayview and Waskesiu from larval drop trays. Mature larvae which cocooned in these trays were collected and shipped to the Winnipeg Laboratory for parasite and disease records. The dissections of these cocoons are summarized in Table 1.

Table 1

Cocoon Counts and Dissections of Larch Sawfly from 20 Larval Drop Trays at two areas in the Northern District of Saskatchewan 1958

Plot No.	Location	No. of trays	No. of cocoons collected	Av. no. cocoons per tray	No. of cocoons destroyed by small mammals	No. of cocoons destroyed by fall Bessa emergence	No. of cocoons examined	No. larch sawfly containing Mesoleius egg	No. larch sawfly containing Mesoleius larva	Per cent effective parasitism based on sound larvae B. harveyii	Per cent effective parasitism based on sound larvae M. tenthredinis	Per cent effective parasitism based on sound larvae T. kluzii	Per cent diseased larvae
111A	Mayview	20	32	1.6	7	1	24	0	0	30.7	0	0	8.3
116	Waskesiu	20	3028	151.4	972	125	200	35	9	37.5	4.5	0	8.5

Egg population sampling of the larch sawfly was continued in four locations in the Northern District and Prince Albert National Park. The infestations at these plots were rated according to the percentage utilization of current tamarack shoots for oviposition. The sample counts and infestation ratings at the plots are shown in Table 2.

Table 2

Population Estimates of the Larch Sawfly
(based on Sequential Sampling of Egg Populations)
Prince Albert National Park and Northern District of Saskatchewan
1958

Plot No.	Location					Infestation Rating		
	Place	Sec.	Tp.	Rge.	Mer.	No. of shoots examined	No. curled	Rating
101	Lac La Ronge	6	70	22	W.2	50	0	light
115	Skunk Creek	14	62	24	W.2	70	2	light
111A	Mayview	24	53	2	W.3	50	0	light
116	Waskesiu	28	57	1	W.3	80	3	light

Tree Mortality.- Large areas of dead tamarack have been observed over the past three years. Three areas in the northern Saskatchewan where this condition is very noticeable are:

I The area lying south of Lake Athabaska and west of Cree Lake.
II The area north of Buffalo Narrows between Churchill and Peter Pond Lakes and in the Frobisher Lake region.
III East of Lac Ile a la Crosse to Pinehouse and Emmeline Lakes.

These areas contained large stands of tamarack, however they are mostly open-growing stagnated trees producing poor foliage and terminal shoots. Tamarack growing around the perimeter of these stands generally are of vigorous growth with good foliage production. A permanent sample plot was established in the Lac La Ronge area in 1954, (Plot 101). The plot was retallied for dead trees in 1956 and 1958. The results of the mortality tallies and defoliation history of this area are summarized in Table 3.

Table 3

Tree Mortality and Larch Sawfly Defoliation of Plot 101
Lac La Ronge
1953 - 1958

Year	Per cent tree mortality of tamarack 1 - 7 inches d.b.h.	Larch sawfly defoliation rating based on ten tagged trees
1953	-	severe
1954	.03	severe
1955	-	severe
1956	30.54	light
1957	-	light
1958	83.22	light

Sequential sampling in Plot 101 from 1954 to 1958 shows a low production of new shoots and needles. These figures are considered typical of the increasing tamarack mortality in certain northern areas.

10.3.2 Large Aspen Tortrix, Choristoneura conflictana Wlk.

A severe outbreak of the large aspen tortrix in the Prince Albert District extended north into the southern portion of the Prince Albert National Park. Two small areas of moderate defoliation were recorded along the south boundary of the park (Fig. 3). Low populations of this leaf defoliator were encountered in all aspen stands in the park and along #2 highway to Lac La Rong, but defoliation was negligible.

10.3.3 Yellow-Headed Spruce Sawfly, Pikonema alaskensis Roh.

Yellow-headed spruce sawfly was recorded in three widely separated areas in the Northern District. An infestation at Montreal Lake (sec. 28, tp. 59, rge. 25, W.2 mer.) which subsided in 1956, reappeared and moderate defoliation of reproduction white spruce was recorded.

The old infestation on Hungry Island and small adjacent islands in Wollaston Lake continued in 1958. Severe defoliation of black spruce ranging from 4 to 8 inches d.b.h. was recorded throughout the infested area. Increasing mortality of black spruce was also noted in the original infestation on Hungry Island. Dead and dying trees are beginning to appear on the adjacent islands recently infested.

Black spruce growing along the shore of Rene Lake (57°-00'N., 110°-00'W.) showed moderate defoliation. Several small islands on the lake showed heavy defoliation and numerous dead tops were visible indicating an infestation of several years duration. Additional collections were made at Waskesiu, Molanosa, Lac La Ronge and Bittern Creek but defoliation was negligible.

10.3.4 Forest Tent Caterpillar, Malacosoma disstria Hbn.

Sampling of aspen stands in the Prince Albert National Park and Northern District in the spring and early summer showed a slight increase in forest tent caterpillar populations (Fig. 2). Several larval collections were made along the south boundary of the Park in an area which had been moderately defoliated by aspen tortrix. Pupal collections were made in the Waskesiu area of the Park but no defoliation was visible in this region. An egg band survey was conducted in the fall in this area and the results are listed in Table 4.

10.3.5 Willow Leaf Beetle, Galerucella decora Say.

Willow leaf beetle caused severe skeletonization of willow foliage along number 2 highway from Lac La Ronge south to Montreal Lake (Fig. 4). Willow foliage in the southeast corner (tp. 53, rge. 1, W.3 mer.) of Prince Albert National Park was also severely skeletonized.

Samples were collected in numerous other areas as far north as Hill Island Lake in the District of MacKenzie, North West Territories but damage was negligible.

Table 4

Summary of Forest Tent Caterpillar Egg Band Counts Based on Three Trembling Aspen Felled at 11 Points in the Northern District 1958

Place	Location				Av. d.b.h. (in.)	Av. ht. (ft.)	No. of egg bands	Av. no of eggs	Per cent			
	Sec.	Tp.	Rge.	Mer.					hatch	diseased eggs	parasitism	unemerged larvae
Waskesiu	10	57	1	W.3	4	29.3	6	194.1	95.3	.1	3.2	1.4
Bittern Creek	35	57	27	W.2	6.3	41.6	1	135	90.4	5.2	4.4	0
Montreal Lake	21	58	26	W.2	5.6	31.6	0	-	-	-	-	-
Namekus Lake	3	56	1	W.3	5	40.0	1	165	98.8	1.2	0	0
Hearts Lake	21	57	1	W.3	4.6	41.0	1	130	100	0	0	0
Trappers Lake	27	55	1	W.3	4.6	46.0	0	-	-	-	-	-
Sandy Lake	10	54	1	W.3	4.3	36.6	0	-	-	-	-	-
Kitigan Creek	21	53	2	W.3	4.1	26.6	1	140	98.4	1.6	0	0
Park Gate	14	53	1	W.3	4.1	23.6	0	-	-	-	-	-
South Boundary	24	53	3	W.3	4	30.0	0	-	-	-	-	-
Montreal Lake	6	58	25	W.2	5.6	38.3	0	-	-	-	-	-

10.3.6 Willow Blotch Miner, Gracillarid sp.

Willow blotch miner in conjunction with the willow leaf beetle caused severe damage to willow foliage along number 2 highway from Birch Creek in the Montreal Lake area north to Lac La Rong. Mining damage caused by this blotch miner was confined mainly to the apical end of the branches. Damage varied from medium to heavy.

10.3.7 Poplar Leaf Beetle, Gonioctena americana (Schaeff.)

The poplar leaf beetle infestation of aspen reproduction along the south and east boundaries of the Prince Albert National Park declined in 1958 and defoliation was recorded as light to moderate. A population decline was also recorded in the Skunk Creek and Lac La Ronge areas where very light defoliation was recorded. At all remaining trembling aspen stands examined in the Northern District defoliation was negligible.

10.3.8 Pitch Nodule Maker, Petrova albicapitana Busck.

This insect was found in low numbers in all jack-pine stands throughout the Northern District and Prince Albert National Park. An old infestation was found in a small jack-pine stand ranging up to 2 inches d.b.h. at Reilly Lake (grid 7-024-380). The infestation has now subsided and very few nodules were found. This insect was recorded as far north as Hill Island Lake but damage was low.

10.3.9 Alder Leaf Miner, Fenusa dohrnii (Tischb.)

Alder leaf miner caused light to moderate damage to alder foliage in the Heart's Lakes and Narrows Road areas of Prince Albert National Park. Light damage was also recorded on alder foliage in the Bittern Creek area north of the Park boundary.

10.3.10 Aspen Blotch Miner, Lithocolletis salicifoliella Cham.

This leaf miner lightly infested trembling aspen foliage in all stands examined from the Prince Albert National Park in the south to Uranium City in the north. Damage in all cases was light.

10.3.11 White Pine Weevil, Pissodes strobi Peck.

White pine weevil damage to the leaders of white and black spruce and occasionally jack-pine was common throughout the Prince Albert National Park and Montreal Lake area. The damage was scattered with the exception of one area between miles 11 and 15, Waskesiu highway, where a moderate infestation was recorded.

10.3.12 A Complex of Insect Species in Black Spruce Tops

Very little change in population levels of this insect complex were noted in 1958. A good cone crop on black spruce in 1958 would indicate a continued infestation. Special collections of all specimens of Herculia thymetusalis were recovered from two heavily infested black spruce tops in early spring and in September. This material will be used at the Winnipeg Laboratory for life history studies of this species.

10.3.13 Webworm on Aspen, Tetralopha asperatella Clem.

Populations of this species increased in all areas where the large aspen tortrix was causing defoliation of aspen. An area of aspen on the south boundary of Prince Albert National Park which suffered moderate defoliation by the large aspen tortrix was followed by a light to moderate infestation of webworm in August and early September. This species feeds within clusters of aspen leaves webbed together. Counts of the number of clusters were made on a 3-tree sample in early September. The results are summarized in Table 5.

Table 5

Tetralopha asperatella Counts on Trembling Aspen

Tree number	d.b.h.	Height	No. of webworm clusters	Defoliation	Cause of defoliation
1	4"	30'	36	moderate	aspen tortrix
2	4"	30'	41	moderate	aspen tortrix
3	4"	30'	39	moderate	aspen tortrix

10.3.14 Two Species of Pitch Midge, Cedidomyia spp.

Three locations in the Prince Albert National Park and Northern District were surveyed for the incidence of two species of pitch midge. In early June, 100 1957 jack-pine shoots were examined and the number of infested shoots were recorded. The counts are summarized in Table 6.

Table 6

Pitch Midge Counts at Three Points in the Northern District 1958

Place	Location Sec.	Tp.	Rge.	Mer.	No. of 1957 shoots examined	No. of shoots infested
Prince Albert N.P.	13	53	1	W.3	100	0
Birch Creek	23	61	24	W.2	100	0
Pine Creek	24	67	23	W.2	100	3

10.3.15 Bark Beetle, Dendroctonus sp.

During 1958 surveys were conducted to determine the status of bark beetles, Dendroctonus sp. in tamarack stands where heavy mortality was recorded. At Buffalo Narrows, a total of fifty tamarack trees were selected at random and examined for the presence of Dendroctonus sp. Of the fifty

trees, averaging 5 inches d.b.h., 22 were dead. Eight of the 22 trees had died in 1958 and 5 of these were infested with Dendroctonus sp. Of the remaining 14 trees which had died previous to 1958, most showed signs of Dendroctonus sp. damage.

10.3.16 A Root Weevil, Hylobius poss. pinicola (Couper)

Jack-pine and white spruce stands were examined at three locations in the Northern District for the presence of the root weevil Hylobius poss. pinicola (Couper). The results of these examinations are summarized in Table 7.

Table 7

Summary of Damage to Conifer Roots by Hylobius poss. pinicola in Three Areas of Northern Saskatchewan

Location	Host tree	No. of trees examined	Per cent roots damaged
Buffalo Narrows	Jack-pine	7	71.4
Beauval	Jack-pine	5	60.9
Niska Lake	White spruce	5	100

10.3.17 A Root Weevil, Hylobius sp.

A survey of the root systems of white spruce in the Bittern Creek area was conducted to determine the damage by Hylobius sp. and incidence of the root rot Polyporus tomentosus. Five living and five dead trees were examined and the weevil damage index was recorded. Portions of two diseased roots from each of the dead trees were collected and sent to the Forest Pathology Laboratory for disease culturing.

A damage index (Warren, G. L., 1956*) for infested white spruce was applied to the sample trees. Results of this survey are summarized in Table 8.

Table 8

Hylobius sp. Damage Index Average at Bittern Creek
Based on 5 living and 5 dead trees

Location	Av. d.b.h.		Average height		Damage index		Av. per cent of roots diseased on living trees	Av. per cent of diseased roots with insect damage on living trees
	living	dead	living	dead	living	dead		
Bittern Creek	6.4"	5.8"	58'	48'	.60	.85	41.9	13.1

* Warren, G. L. The effect of some site factors on the abundance of Hypomolyx piceus. Ecology, Vol. 37, No. 1, 1956.

10.3.18 Other Noteworthy Insects

The following insect species were generally distributed throughout the district but caused no noticeable defoliation.

Table 9

Insect	Location(s)	Remarks
Archips cerasivorana	South boundary of P.A.N.P.	Very light infestation on roadside bushes
Halisidota maculata	P.A.N.P., Montreal Lake, Lac La Ronge	Populations low
Nematus chalceus	Mayview Corner, Kitigan Creek	Several colonies collected from willow
Neodiprion virginiana	Lac La Ronge, Waskesiu	Populations very low in 1958, defoliation very light
Nycteola frigidana	Bigstone Lake	Occasionally on balsam poplar, no defoliation
Cinara spp.	All of Norther Dis.	Common on all tree species
Chrysomela interrupta	Bigston Lake, Waskesiu	Found on alder and balsam poplar, light damage
Galerucella cavicollis	Lac La Ronge	Light infestation on pincherry
Neodiprion maurus	Pine Creek, Skunk Ck.	Light defoliation of jack-pine
Semicthisa sexmaculata	Larch stands in Northern District	Populations low
Nymphalis antiopia	Uranium City	Several colonies on reproduction aspen
Phytophaga rigidae	Throughout district	Common on willow shrubs
Chermes lariciatus	Throughout district	Common on white and black spruce
Pikonema dimmockii	Throughout district	Populations very low
Itonida balsamicola	P.A.N.P.	Light infestation on balsam fir
Neodiprion nanulus	Waskesiu	Populations low
Mordwilkoja vagabunda	Throughout district	Common on reproduction aspen
Rhabdophaga swainei	Throughout district	Common reproduction black spruce buds.
Choristoneura pinus	P.A.N.P., Pine Crk.	Populations very low, no defoliation
Acleris variana	Throughout Northern district, P.A.N.P.	Populations very low
Neodiprion abietis	Buffalo Narrows area	Severe on Island in Churchill Lake

10.3.19 Root Collar Borers on Trembling Aspen

Investigations were started in the Prince Albert District to identify various species of wood borers infesting the roots, root collars and lower stems of small stunted aspen and balsam poplar growing on poor sites (Fig. 10). Three species of wood borer larvae have been collected, Buprestid sp. Cerambycid sp. and Cossid sp. An attempt to rear these larvae to the adult stage is being carried out in the Winnipeg Laboratory. Wire screen cages were placed around infested root collars at Prince Albert in an attempt to trap emerging adults (Fig. 11). To date no adults have been recovered.

10.4 TREE DISEASE CONDITIONS

10.4.1 White-Pocket Rot, Plyporus tomentosus

Two plots were established for special examination of spruce roots for the white-pocket rot, P. tomentosus.

Plot I (N.S. I).- was established in a stand 10 miles south of Lac La Ronge. The area is treed with black spruce in association with larch, balsam poplar and jack-pine scattered throughout the stand. The plot was established on the east slope of a ridge (15°); a heavy moss cover (12 to 15 inches) covered the sand and gravel. The stand was moderately open and several underground streams bisected the plot. Mortality of black spruce was light.

Plot 2 (N.S. 2).- was established in a mixed stand at mile 6, Lac La Ronge Highway near Bittern Creek. Tree species in the plot consisted of white spruce, black spruce, jack-pine, trembling aspen and balsam poplar. Clumps of alder and willows made up the understory while the ground cover of moss was fairly shallow (3 to 5 inches). Aspect of this plot was level. Tree mortality was light.

Five dead trees were examined for root diseases. Two diseased roots from each tree were forwarded to Saskatoon Laboratory for examination (Table 10).

10.4.2 Jack-pine Mistletoe, Arceuthobium americanum

A more northerly range of the known infestation boundaries of the jack-pine mistletoe was established in 1958. A small severely infected stand of jack-pine was recorded on the Saskatchewan-Alberta boundary at the 58° parallel (Rene Lake). Numerous trees have been killed and branch mortality appeared high.

Female mistletoe plants examined showed a high percentage infected with the fungus Wallrothiella arceuthobii.

10.4.3 Winter Browning of Conifers

Winter browning of white and black spruce was common in the Waskesiu area of Prince Albert National Park.

Table 10

Data Recorded from P. tomentosus Survey
Northern District of Saskatchewan 1958

Location	Size of plot (acre)	Av. tree height	Av. age of stand	No. of trees examined	No. of patches per acre	No. of groups per acre	No. of single trees per acre	No. of healthy roots	No. of decayed roots	No. of decomposed roots	No. of root samples with P. tomentosus	No. of root samples with A. mellea	No. of root samples with unknown
N.S. I Lac La Ronge	1	40'	90	5	0	4	11	1	23	2	0	4	6
N.S. 2 Bittern Creek	1	57'	60	5	1	5	21	8	18	3	0	4	5

10.4.4 Frost Damage to Aspen

Frost damage to aspen foliage was recorded in aspen stands in the southern portions of Prince Albert National Park and south of Candle Lake.

10.4.5 Needle Rust on Conifers, Chrysomyxa sp.

A needle rust, Chrysomyxa sp., lightly infected foliage of white and black spruce in all areas examined. White and black spruce at Skunk Creek were light to moderately infected.

10.4.6 Other Noteworthy Tree Diseases

Table 11

Tree disease	Host	Location
Powdery mildew	willow	Hill Island Lk., N.W.T.
Canker	Pincherry	Prince Albert, Sask.
Cytospora canker	aspen	Lac La Ronge, Waskaw, Sask.
Cryptomees canker	willow	P.A.N.P., Sask.
Black knot	pincherry	Lac La Ronge, Barford, Sask.
Leaf rust	nettles	Waskesiu, Sask.
Globose rust gall	jack-pine	Montreal River Road
Die-back	larch	Skunk Creek, Sask.
Cone rust	white spruce cones	Montreal River Road
Needle rust	balsam fir	Lac La Ronge, Montreal R. Rd.

10.5 SPECIAL PROJECTS

10.5.1 Phenological Studies

Measurement of new growth of jack-pine, spruce, aspen and tamarack were continued at three previously established plots. Measurements were made in June and September.

10.5.2 Special Collections

Numerous types of special collections were made during the 1958 field season for various research officers and survey projects for the Winnipeg Laboratory. The collections are listed in Table 12.

10.5.3 Summary of Insect and Tree Disease Collections 1958

Table 13 lists by tree species the number of insect and tree disease samples collected in the Prince Albert National Park and Northern District of Saskatchewan.

Table 12

Summary of Special Collections
1958

Type of collections	No. of collections	Collected for	Total time spent on collections
Aphid collections from forest trees	43	G. Bradley	Collected during field surveys
Herculia thymetusalis larvae	2	H.R. Wong	2 days
Colonies of Neodiprion spp.	41	Survey	Collected during field surveys
Mass collection of Pikonema alaskensis Roh. larvae	1	Survey	1 day
Cicindella spp. adults	1 collec. (100 adults)	J. Melvin	1 day

Table 13

Summary of Insect and Disease Collections

Tree host	Insect collections	Tree disease collections
White spruce	14	4
Black spruce	19	4
Jack-pine	31	3
Balsam fir	4	2
Trembling aspen	43	3
Manitoba maple	--	-
Balsam poplar	8	-
White birch	9	-
White elm	--	-
Tamarack	28	2
Miscellaneous	45	2
Totals	201	20

10.5.4 Permanent Sample Plots and Stations

Three tamarack plots were discontinued in 1958 due to severe tree mortality and cutting operations. One tamarack plot was re-established at Mayview to replace one which had been killed by high water. Two additional tamarack plots will be established in 1959. Frequency of occurrence studies on standard 5 tree beating collections at permanent sample plots and stations were conducted in 1958. Results are shown in Table 14.

Table 14

Summary of Collections of Major Insect Species from
Permanent Sample Plots and Sampling Stations
Based on 5 Tree Beating Samples
Northern District of Saskatchewan 1958

Insect species	No. of plots and stations sampled	Sample numbers	No. of samples containing larvae and pupae	Av. no. of larvae and pupae per beating sample
Choristoneura conflictana	5	W-1159,W-1185, W-0204	5	.4
Sciaphila duplex	5	W-1159	1	.2
Epinotia nisella criddleana	5	W-0211	1	.8
Pikonema alaskensis	1	W-2173	1	1
Anoplonyx luteipes	2	W-2166	1	.6
Neodiprion maurus	1	W-2210,W-2594	1	1.9
Pandemis canadana	5	W-1191,W-1185	2	.2
Cimbex americana	5	W-2203	1	.2
Nycteola frigidana	1	W-2544	1	1.8
Gonioctena americana	5	W-0229	1	1.4

11. ANNUAL REPORT OF FOREST BIOLOGY RANGERS

WEST-CENTRAL DISTRICT OF SASKATCHEWAN

1958

by

B. B. McLeod and G. Lalor

INTERIM REPORT 1958

FOREST BIOLOGY LABORATORY

WINNIPEG, MANITOBA

March 1959

11.1 INTRODUCTION

Surveys of the West-Central District were carried out by B. McLeod and G. Lalor. Several insect infestations such as the large aspen tortrix, boxelder twig borer, fall cankerworm, forest tent caterpillar and leaf rollers attacking aspen were mapped. Special sampling methods were used to determine the population levels of boxelder twig borer and forest tent caterpillar. Phenological records were taken at established stations throughout the district.

A total of 157 insect and tree disease collections were submitted to the Winnipeg and Saskatoon laboratories for identification.

11.2 REVIEW OF FOREST INSECT AND TREE DISEASES

The large aspen tortrix severely defoliated large areas of trembling aspen in the aspen grove section and a number of shelterbelts. The webworm, Tetralopha asperatella (Clem.), was found in fairly high numbers in all stands infested by the above species. There was a decrease in the incidence of boxelder twig borer and fall cankerworm on Manitoba maple. The tent caterpillar was found at a number of points in 1958 but defoliation of trembling aspen caused by this species was very light. The gray-willow leaf beetle severely skeletonized willow foliage in the eastern portion of the district. A leaf roller, Epinotia nisella criddleana, caused moderate defoliation of trembling aspen in the western portion of the district.

11.3 INSECT CONDITIONS

11.3.1 Large Aspen Tortrix, Choristoneura conflictana Wlk.

Moderate to severe defoliation of trembling aspen stands occurred in several areas of the aspen grove region in the West-Central District in 1958 (Fig. 3). In the eastern portion of the district high populations of aspen tortrix severely defoliated trees in an area bounded by #2 highway on the west, #6 highway on the east, #3 highway on the north, and #5 highway on the south. Approximately 100 square miles of trembling aspen was severely defoliated in the Red Pheasant area near Old Battleford on the west side of the district. Severe defoliation of woodlots was recorded at Prudhomme, Raymore and Wadena. Lightly defoliated woodlots were found near Macklin, Delisle, Millerdale, Rosetown, Wilkie and Bremen. Refoliation of aspen in the medium to heavily defoliated stands and woodlots was generally poor.

Predation of larvae by ants, beetles and several avian species was observed. Numerous larval and pupal parasites together with disease accounted for some measure of control.

11.3.2 Forest Tent Caterpillar, Malacosoma disstria Hbn.

Although the forest tent caterpillar increased in abundance in the district this year, populations were still low and defoliation was negligible. Collections were taken at Waldheim, Clarkborough, Prudhomme, Meskanaw, Lepine, Yellow Creek and Crystal Springs (Fig. 2).

An egg band survey was carried out along highway no. 20 in the infested area. At each of 5 sampling stations, 3 co-dominant trees were examined for bands, but the results were negative. The locations of sampling stations are listed in Table 1.

Table 1

Summary of Forest Tent Caterpillar Egg Band Survey
West-Central District 1958

Sample point	Sec.	Tp.	Rge.	Mer.	No. of trees	Av. d.b.h.	Av. ht.	Av. no. of egg bands
1	28	46	25	W.2	3	5.3	45	0
2	26	45	18	W.2	3	4	40	0
3	13	44	24	W.2	3	6.3	51.6	0
4	7	43	23	W.2	3	4	33.3	0
5	3	42	24	W.2	3	4	30	0

No conspicuous defoliation is expected in these areas in 1959.

11.3.3 Gray-Willow Leaf Beetle, Galerucella decora Say.

Severe skeletonization of willow foliage occurred near Sylvania and between Dafoe and Watson. It was also collected at numerous locations in the norther part of the district but damage was recorded as light (Fig. 4).

11.3.4 A Webworm on Poplar, Tetralopha asperatella (Clem.)

This webworm increased mainly in areas previously defoliated by the large aspen tortrix. Light damage was recorded at Meskanaw, Yellow Creek, Crystal Springs, St. Benedict, Lepine and St. Brieux.

11.3.5 Boxelder Twig Borer, Proteoteras willingana (Kft.)

This borer was again found on most Manitoba maple examined in the district, but populations were generally lower than in 1957. Counts on infested twigs were made at several permanent sampling stations. At each point, four branch samples were examined from each of three crown levels on 5 sample trees. The percentages of twigs infested are shown in Table 2.

Table 2

Results of Special Sampling of Boxelder Twig Borer Populations 1958

Place	Grid	No. of twigs examined 1958	No. of twigs infested 1958	Percentage twigs infested 1958	Percentage twigs infested 1957
Domremy	8-078-303	2408	106	4.4	14.8
Watrous	8-081-284	2230	25	1.1	12.1
Watson	8-091-292	1970	65	3.3	15.2
Ethelton	8-087-304	2491	152	6.1	6.8
Radisson	8-060-297	693	23	3.3	17.7
Floral	8-070-291	1073	71	6.6	16.7
Vanscoy	8-065-291	922	14	1.5	24.1
Outlook	8-064-281	866	24	2.4	15.6
Millerdale	8-044-286	672	43	6.5	6.3
Macklin	8-034-296	750	19	2.5	--

Light twig mortality due to last years feeding damage was noted in most areas.

11.3.6 Fall Cankerworm, Alsophila pometaria (Harr.)

Moderate defoliation of Manitoba maple shelterbelts occurred in the Vanscoy area. High populations of this insect were again present in a shelterbelt on the farm of Mr. A. Olouson, 3.5 miles north of Vanscoy. Spraying of this shelterbelt on June 1 produced effective control. Surveys of previously infested shelterbelts showed that a high percentage of the cankerworm egg patches failed to hatch. The 1957 moderate infestation in the Milden and Ardath regions declined to light in 1958. Shelterbelts in the northern parts of the district were free of attack.

11.3.7 Leaf Roller, Epinotia nisella criddleana

This insect was again the main defoliator of trembling aspen in the western part of the district. Trembling aspen woodlots in the Scott and Biggar areas were severely (75 per cent) defoliated. In the Harris and Millerdale areas, moderate defoliation occurred in woodlots. Elsewhere in the district, this leaf roller caused only light defoliation.

11.3.8 Spruce Budworm, Choristoneura fumiferana Clem.

Small numbers of spruce budworm caused very light defoliation of current needle growth in a white spruce shelterbelt at Ethelton. Another shelterbelt, 1.5 miles west of Rosthern, was severely defoliated of new foliage by a combined attack of Choristoneura fumiferana Clem. and Dioryctria reniculella (Grote). Several empty pupal cases were found in a white spruce shelterbelt at Lanigan but no defoliation was noted.

11.3.9 Other Noteworthy Insects

The following insect species were generally distributed throughout the district but caused no noticeable defoliation.

Table 3

Insect species	Location	Host	Remarks
Archips rosaceana	general	tA	Populations light
Archips negundana	general	tA	Populations light
Neodiprion abietis	Rosthern	wS	Populations low in shelterbelts
Pandemis canadana	general	tA	Populations very low no defoliation
Laspeyresia youngana	Ethelton, Domremy	wS	Populations low, cone damage light
Meroptera pravella	general	tA	Population low, damage light
Toumeyella numismaticum	Melfort	lP	Shelterbelt lightly infested
Oberea schaumi	general	tA	Common in reproduction
Pristiphora erichsonii	Sylvania	tL	Populations low, defoliation light
Archips cerasivorana	general	cCh	Widely scattered
Malacosoma lutescens	general	cCh	Lightly scattered

11.4 TREE DISEASE CONDITIONS

11.4.1 Canker of Poplar, Hypoxylon pruinatum

Dying and dead trembling aspen girdled by Hypoxylon cankers was observed throughout the West-Central District. Shelterbelts and woodlots which have been used as pasture appear to have suffered the most damage as the roots and stems have been weakened by cattle. Varying degrees of damage were observed in the Crystal Springs, Tarnapol and St. Brieux areas.

11.4.2 Leaf Blight, Linospora tetrospora

Light leaf blight infections on balsam poplar foliage was observed in low damp areas at Wakaw and Middle Lake.

11.4.3 Hail Injury

Twig and small branch mortality to trembling aspen was observed in the Punnichy - Touchwood Hills areas where a severe hail storm caused moderate damage on July 17, 1957. No tree mortality was observed. North of Punnichy where severe damage was observed, some willow and reproduction aspen mortality was noted.

11.5 SPECIAL PROJECTS

11.5.1 Phenological Studies

Measurement of new growth was continued in previously established stations in the West-Central District. Measurements were made in June and September. Locations of these phenological stations are: Southerland, Scott, Lanigan and Melfort.

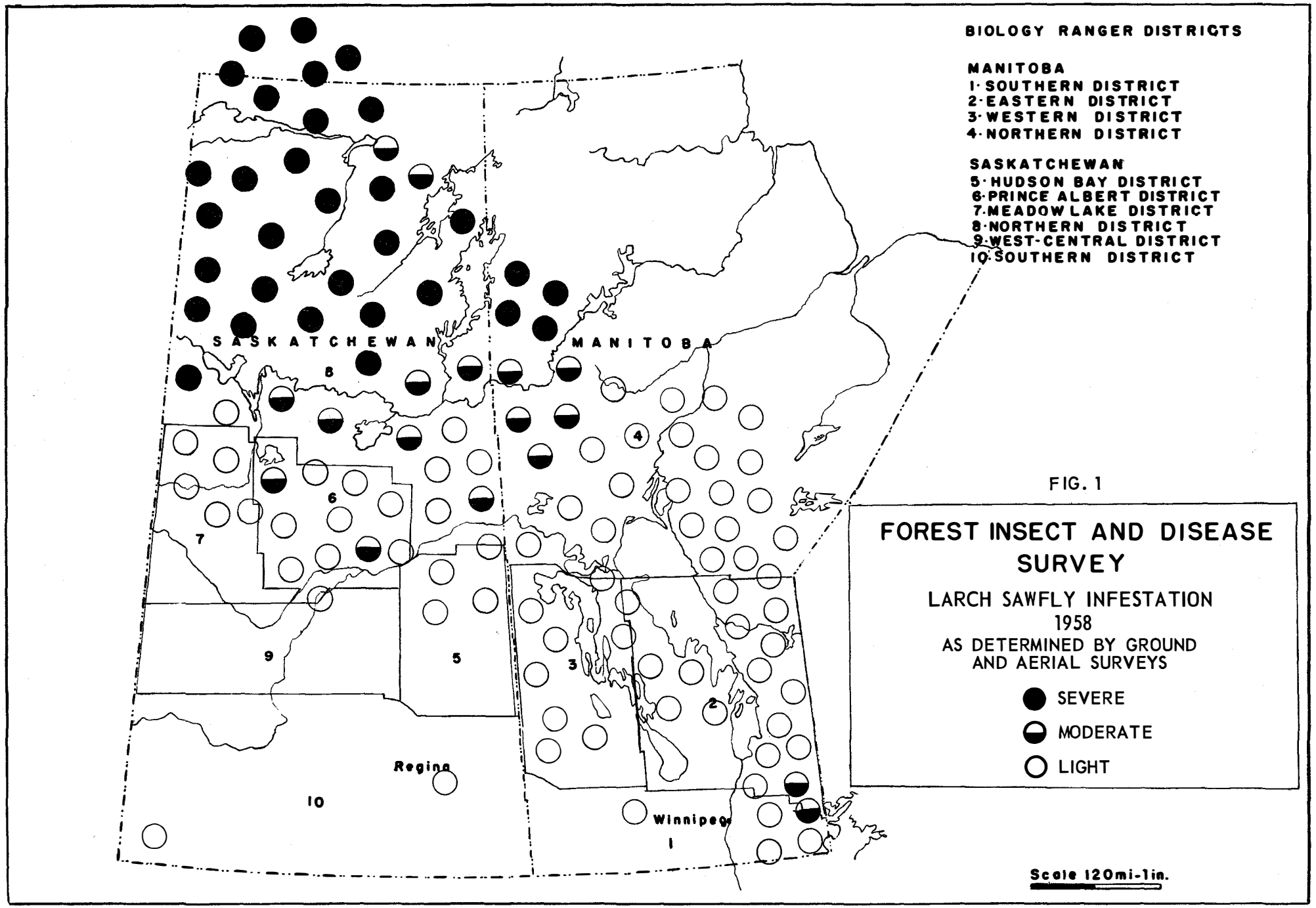
11.5.2 Summary of Insect and Tree Disease Collections 1958

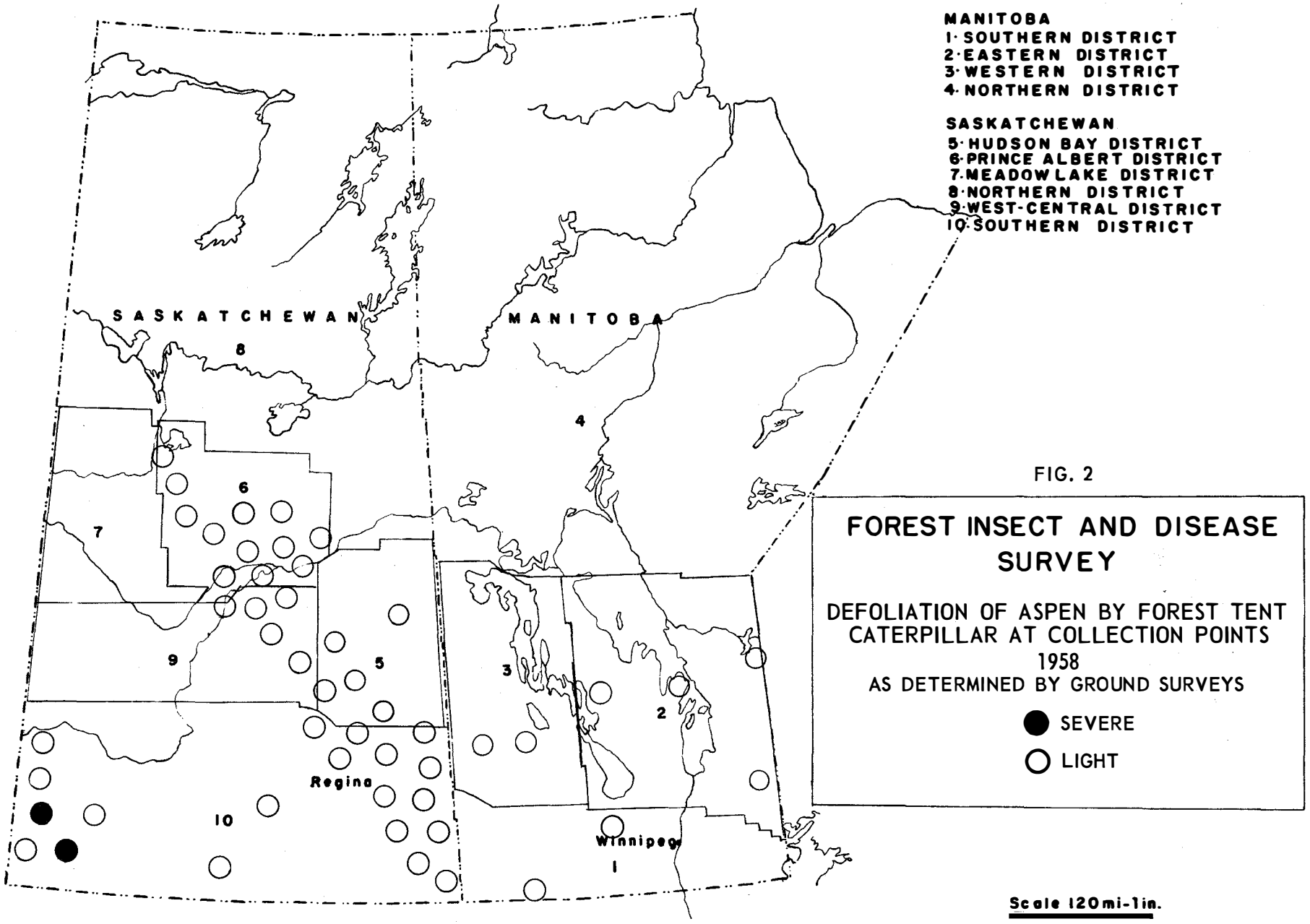
Table 4 lists by tree species the number of insect and tree disease samples collected in the West-Central District of Saskatchewan.

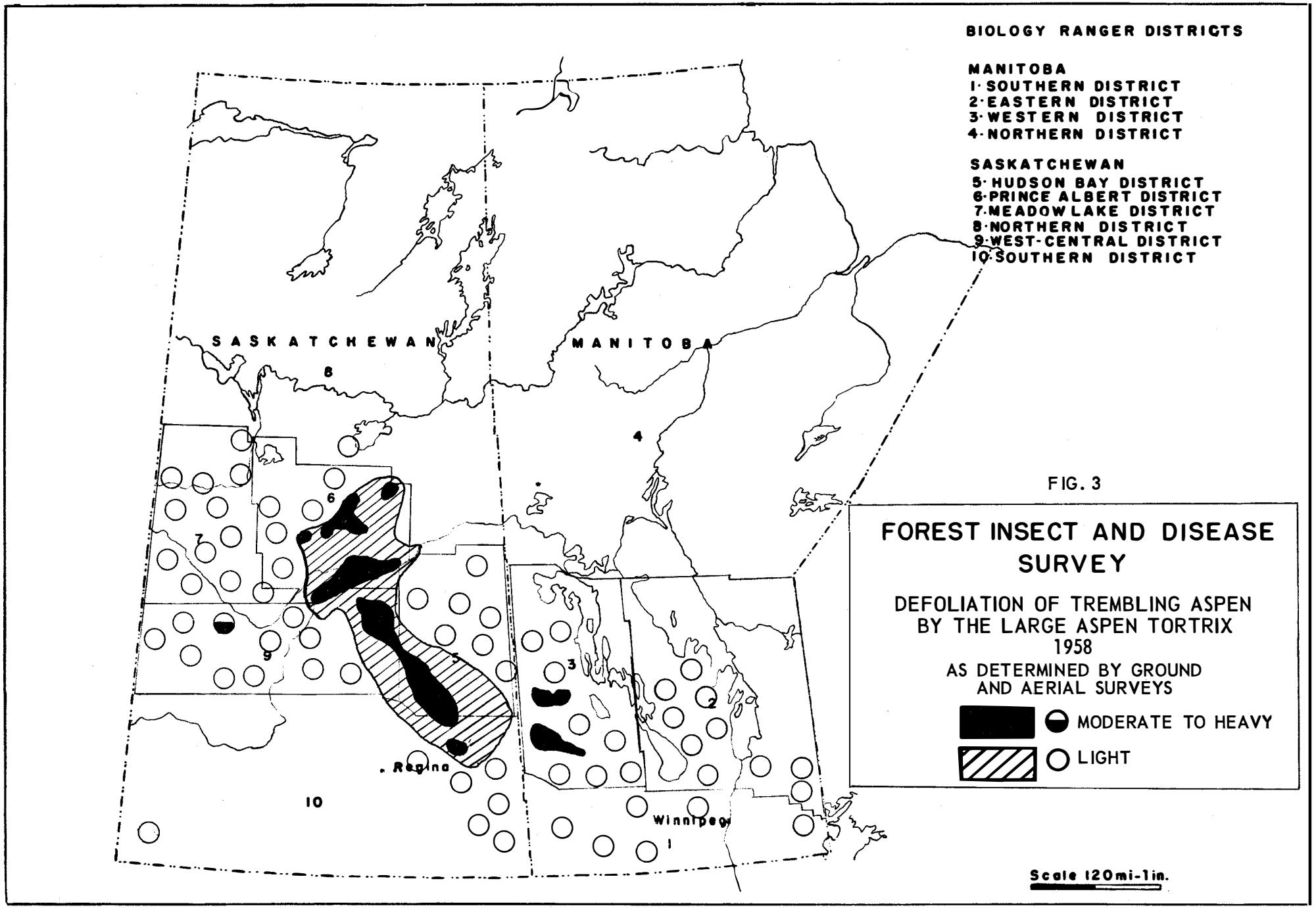
Table 4

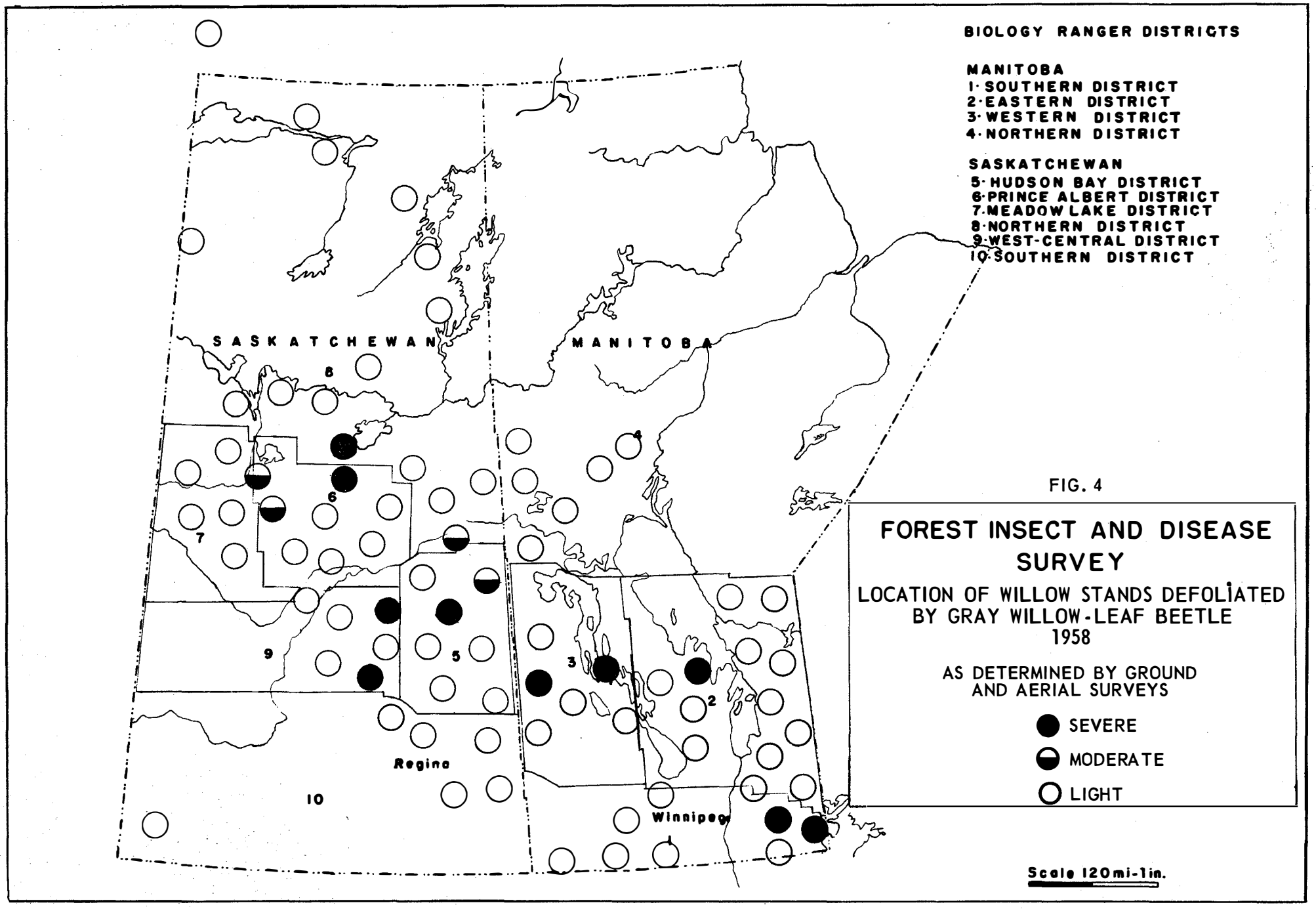
Summary of Insect and Disease Collections
West-Central District 1958

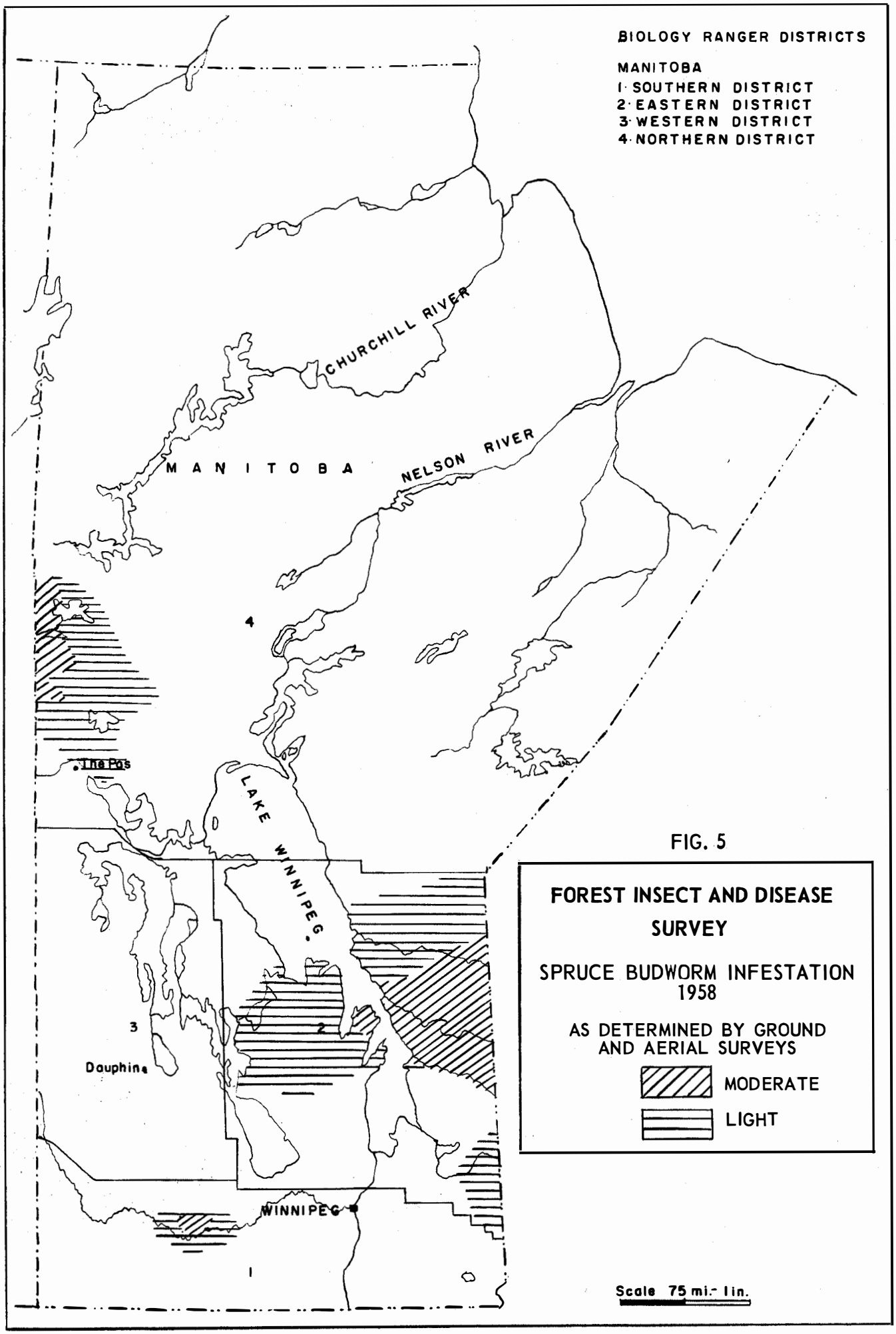
Tree host	Insect collections	Tree disease collections
White spruce	21	-
Trembling aspen	49	1
Manitoba maple	52	-
Balsam poplar	10	-
White elm	2	-
Tamarack	1	-
Miscellaneous	18	3
Totals	153	4


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
SASKATCHEWAN
MANITOBA
Regina
Winnipeg
FIG. 1
FOREST INSECT AND DISEASE SURVEY
LARCH SAWFLY INFESTATION
1958
AS DETERMINED BY GROUND AND AERIAL SURVEYS
SEVERE
MODERATE
LIGHT
Scale 120mi-1in.


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
SASKATCHEWAN
MANITOBA
8
4
6
7
9
5
3
2
Regina
10
Winnipeg
1
FIG. 2
FOREST INSECT AND DISEASE SURVEY
DEFOLIATION OF ASPEN BY FOREST TENT CATERPILLAR AT COLLECTION POINTS
1958
AS DETERMINED BY GROUND SURVEYS
SEVERE
LIGHT
Scale 120mi-1in.


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
SASKATCHEWAN
MANITOBA
8
4
6
7
9
5
3
2
1
10
Regina
Winnipeg
FIG. 3
FOREST INSECT AND DISEASE SURVEY
DEFOLIATION OF TREMBLING ASPEN BY THE LARGE ASPEN TORTRIX
1958
AS DETERMINED BY GROUND AND AERIAL SURVEYS
MODERATE TO HEAVY
LIGHT
Scale 120mi-1in.


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
SASKATCHEWAN
MANITOBA
Regina
Winnipeg
FIG. 4
FOREST INSECT AND DISEASE SURVEY
LOCATION OF WILLOW STANDS DEFOLIATED BY GRAY WILLOW-LEAF BEETLE 1958
AS DETERMINED BY GROUND AND AERIAL SURVEYS
SEVERE
MODERATE
LIGHT
Scale 120mi-1in.


BIOLOGY RANGER DISTRICTS
MANITOBA
1 SOUTHERN DISTRICT
2 EASTERN DISTRICT
3 WESTERN DISTRICT
4 NORTHERN DISTRICT
CHURCHILL RIVER
MANITOBA
NELSON RIVER
4
The Pas
LAKE WINNIPEG
3
2
Dauphin
WINNIPEG
1
FIG. 5
FOREST INSECT AND DISEASE SURVEY
SPRUCE BUDWORM INFESTATION 1958
AS DETERMINED BY GROUND AND AERIAL SURVEYS
MODERATE
LIGHT
Scale 75 mi.- 1 in.

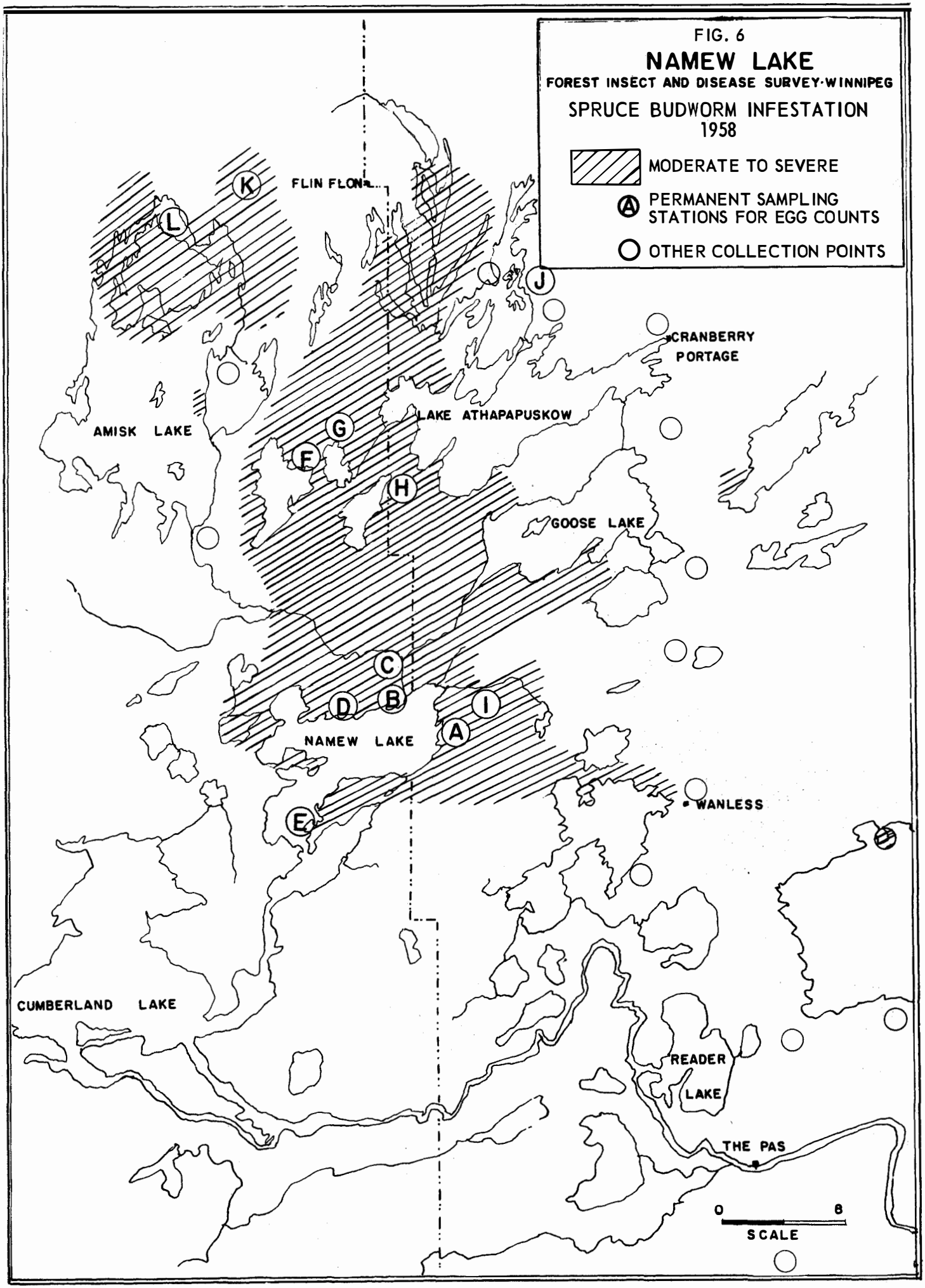
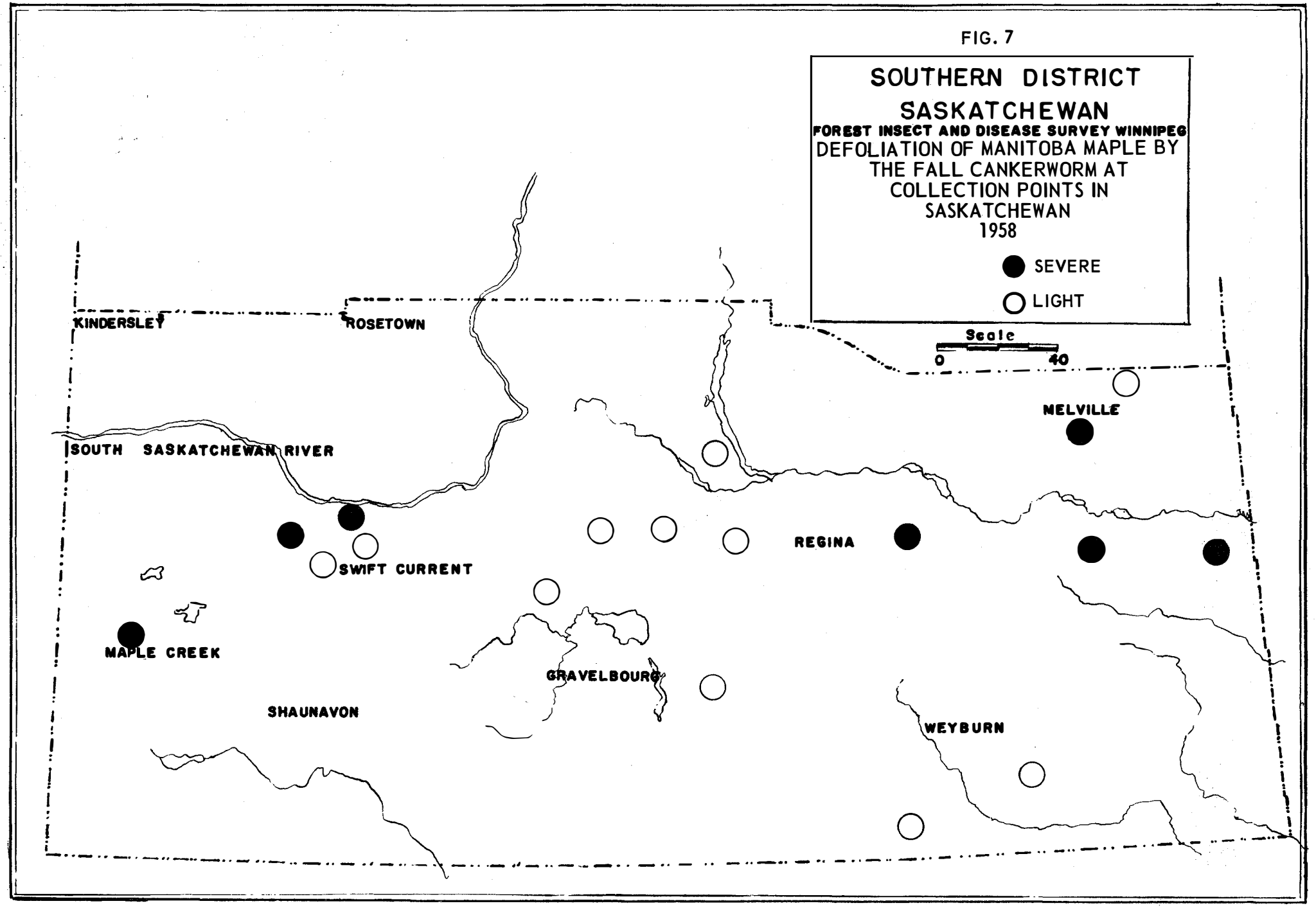


FIG. 6
NAMEW LAKE
FOREST INSECT AND DISEASE SURVEY·WINNIPEG
SPRUCE BUDWORM INFESTATION
1958
MODERATE TO SEVERE
PERMANENT SAMPLING STATIONS FOR EGG COUNTS
OTHER COLLECTION POINTS
FLIN FLON
CRANBERRY PORTAGE
LAKE ATHAPAPUSKOW
AMISK LAKE
GOOSE LAKE
NAMEW LAKE
WANLESS
CUMBERLAND LAKE
READER LAKE
THE PAS
SCALE
0
8
K
L
J
G
F
H
C
D
B
I
A
E

FIG. 7


SOUTHERN DISTRICT
SASKATCHEWAN
FOREST INSECT AND DISEASE SURVEY WINNIPEG
DEFOLIATION OF MANITOBA MAPLE BY THE FALL CANKERWORM AT COLLECTION POINTS IN SASKATCHEWAN
1958
SEVERE
LIGHT
Scale
0
40
KINDERSLEY
ROSETOWN
SOUTH SASKATCHEWAN RIVER
MELVILLE
SWIFT CURRENT
REGINA
MAPLE CREEK
GRAVELBOURG
SHAUNAVON
WEYBURN

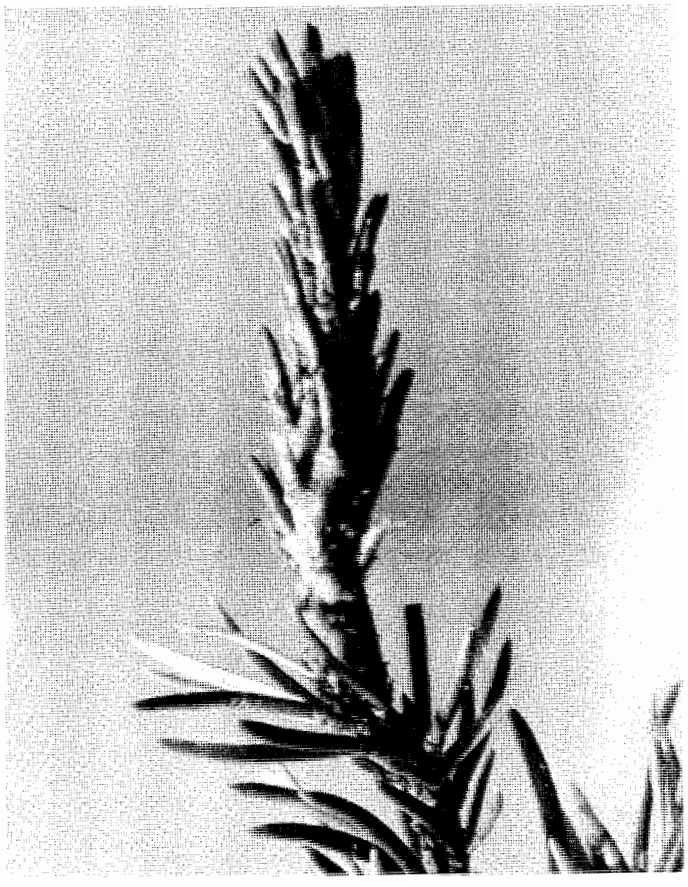


Fig. 8 W-0033
Photo by B. McLeod
Swelling of a New Jack Pine Shoot Caused by a Gall Forming Sawfly, Xyelid sp.

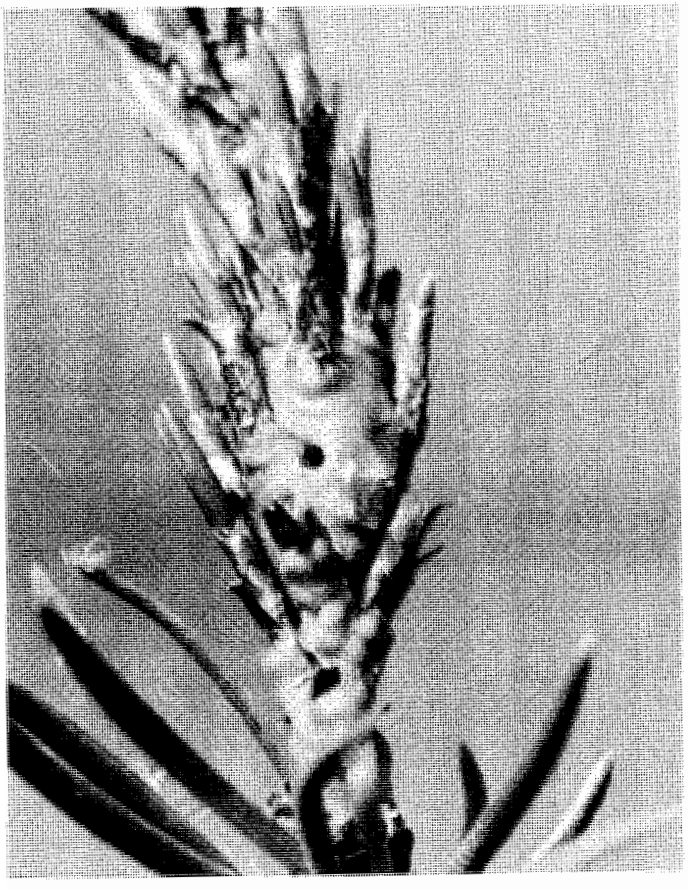


Fig. 9 W-0034
Photo by B. McLeod
Emergence hole in Gall Formed on New Jack Pine Shoot by a Sawfly, Xyelid sp.

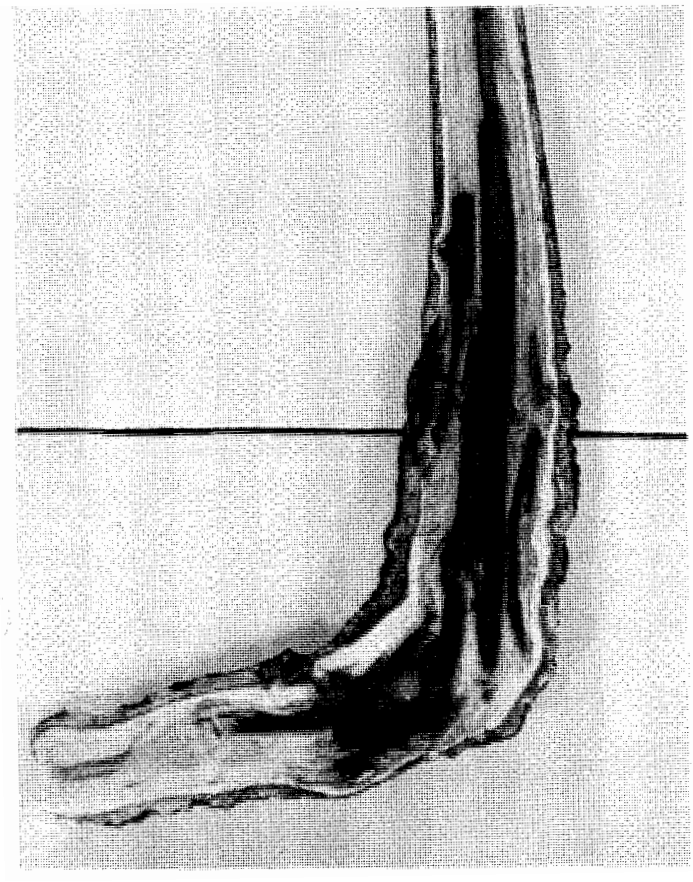


Fig. 10 W-0042
Photo by B. McLeod
Section of Trembling Aspen Root Showing Interior Damage by Root Borers. Black Line Indicates Ground Level.

Fig. 11 W-0115
Photo by J.A. Drouin
Wire Cage on Root Collar of Small Trembling Aspen to Trap Emerging Wood Borer Adults.

INDEX TO INSECT SPECIES

INDEX TO TREE DISEASES