



**ANNUAL DISTRICT REPORTS
FOREST INSECT AND DISEASE SURVEY
NEWFOUNDLAND
1965**

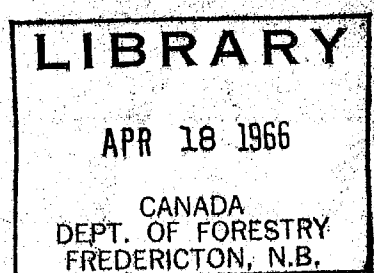
MISCELLANEOUS FOREST INSECTS AND TREE DISEASES

by

W. C. Parrott, L. J. Clarke,
E. M. Haines and H. G. Taylor

INFORMATION REPORT NX-3
CORNER BROOK, NFLD.

DEPARTMENT OF FORESTRY
JANUARY, 1966



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CANADA
DEPARTMENT OF FORESTRY
January, 1966

FOREWORD

The Forest Insect and Disease Survey continued the annual insect and disease sampling and damage appraisal investigation in Newfoundland and Labrador. Results of aerial and special surveys and reports of insect and disease conditions are described in the accompanying reports.

Changes in the staff of the Survey during the year were as follows: Lester Oldford, Research Technician in District 1, Western Newfoundland, was transferred from the Survey to the Entomology Section. H. G. Taylor reported for duty as a Research Technician in March and replaced Mr. Oldford. Mr. Taylor resigned his position to enter Memorial University in September and he was replaced by E. C. Banfield.

Field technicians spent a total of about one man-year on studies conducted to determine population levels, dispersal and effectiveness of the introduced shrew, Sorex cinereus cinereus Kerr.

Balsam fir shoot growth measurements were recorded for the sixth consecutive year at phenology plots in Districts 1 and 2.

Weather conditions were cool and wet during spring and early summer but average temperatures and below normal rainfall prevailed for the remainder of the season. Strong southwest winds persisted from May through August and one gale-force storm was recorded in September.

The boundaries of most balsam woolly aphid infestations were extended in 1965 and several new spot outbreaks were recorded. Black-headed budworm infestations developed to outbreak proportions in stands of fir and spruce in central Newfoundland and the infestations that had caused severe defoliation in eastern Newfoundland since 1961 subsided. Minor increases were recorded in numbers and distribution of the European spruce sawfly, spruce budmoth, balsam twig aphid, birch casebearer and birch leaf miners. There was a marked decrease in the size and intensity of larch sawfly infestations. Balsam fir sawfly infestations disappeared and only a few spruce budworm and hemlock looper larvae were collected.

Foliage diseases were of minor importance and no concerted effort was made to assess stem and root diseases. However, severe ice and snow damage was recorded in central Newfoundland.

SECTION I
FOREST INSECT AND DISEASE SURVEY
DISTRICT 1, WESTERN NEWFOUNDLAND

W. C. Parrott and H. G. Taylor

INTRODUCTION

The 1965 field season began in mid-May with the establishment of five 50-acre balsam woolly aphid damage appraisal plots in the Bottom Brook, Little Barachois Brook, Flat Bay Brook, Fishels River and Crabbes River watersheds. These plots were established to determine the rate and extent of balsam fir mortality and to compare the variability between ground and aerial cruise line results.

The collecting program of the Insect and Disease Survey commenced on June 21 when random and point sampling was carried out in the Codroy Valley. This program was continued until late August. A total of 639 insect and 30 disease samples was collected.

Fourteen thousand miles were travelled in departmental vehicles in District 1. Ten hours were flown on aerial surveys in a Super-cub aircraft and an additional 15 hours were flown on special aphid surveys in a SJ55 Sikorsky helicopter. The aircraft were chartered from the Provincial Department of Mines, Agriculture and Resources. A boat was used for approximately 200 miles around the shores of Grand and George's lakes.

The area of established balsam woolly aphid infestations increased in size and degree of damage. Small outbreaks of the larch sawfly were recorded on the Baie Verte Peninsula and southwest of Grand Lake. Spruce budmoth larvae were common on white spruce along the coast from Cape Ray to Corner Brook in western Newfoundland. However, defoliation was never more than 10% of current year's foliage. Balsam fir sawfly infestations terminated in the Gallants-George's Lake area and spruce budworm and hemlock looper population levels were extremely low in the District. Larch casebearer numbers were the lowest in years except in the Codroy Valley where light to medium defoliation occurred. The birch casebearer, the birch leaf miner and a birch leaf-mining sawfly combined to cause considerable browning of white birch reproduction along roadsides throughout western Newfoundland.

A high incidence of *Armillaria* root rot was reported on balsam fir in balsam woolly aphid infested stands. Shoot and leaf blight of poplar, ink spot of poplar and needle casts of balsam fir and larch increased in intensity but there was a decrease in the incidence of needle rusts of spruce from 1964.

The weather was wet and cool early in the season and dry and windy in late July and August.

Growth studies were continued in the phenology study plots near Corner Brook and at Reidsville. Current growth of selected north lateral branches on 10 balsam fir was measured at weekly intervals. The average shoot growth for these trees is summarized by plots:

Location	Date of average growth		
	North lateral		Total
	25%	50%	
Reidsville	June 20	June 30	July 28
Corner Brook	" 20	" 28	Aug. 1
Average	June 20	June 29	July 30

INSECT CONDITIONS

Balsam Woolly Aphid, *Adelges piceae* (Ratz.)--The boundaries of the main infestation in western Newfoundland changed considerably. The most significant change occurred along the Trans Canada Highway between Deer Lake and Hampden Road, and north of Bonne Bay. Injury symptoms were more pronounced in the Bonne Bay area and along the southeast shore of Grand Lake. For additional information on balsam woolly aphid conditions see Section IV, "Special Survey Balsam Woolly Aphid (*Adelges piceae* (Ratz.))."

Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Guen.)--Hemlock looper population levels were low for the second consecutive year. Only one larvae was collected on the Northern Peninsula where very severe outbreaks have occurred in the past. Small numbers of larvae were found on balsam fir, white spruce and black spruce between Grand and Little Grand lakes. However, defoliation was less than 5%.

<u>Collections</u>	<u>Larvae per tree sample</u>
10	1.2

Balsam Fir Sawfly, Neodiprion abietis complex--Balsam fir sawfly infestations that have persisted for the past 4 years in the Gallants-George's Lake area have terminated and only a few larvae were collected from immature balsam fir. No defoliation was visible from the air during a helicopter survey of the area in late September.

<u>Collections</u>	<u>Larvae per tree sample</u>	
	Av.	Dev. from 1964
8	2.7	-14.0

Spruce Budworm, Choristoneura fumiferana (Clem.)--Numbers of budworm remained low for the second consecutive year. In late June a few larvae were found feeding in association with spruce budmoth, on white spruce, along Steel Mountain Road in the St. George's area. Defoliation was recorded as approximately 5% of current year's foliage. Infested stands were rechecked in mid-July and there was no increase in larval populations or defoliation.

<u>Collections</u>	<u>Larvae per tree sample</u>	
	Av.	Dev. from 1964
25	0.7	-0.2

Spruce Budmoth, Zeiraphera ratzeburgiana Ratz.--Spruce budmoth larvae were the most common insects collected on white spruce along coastal areas of western Newfoundland. Larvae were usually collected with small numbers of spruce budworm, black-headed budworm and micro-moth. Population levels were recorded as 8.7 larvae per tree as compared to 6.6 per tree in 1964. Defoliation did not exceed 5% of current year's foliage in any locality. A summary of damage caused by the spruce budmoth and associated defoliators follows:

Location	Host	Average larvae per tree sample	Per cent new shoots infested	Per cent defolia- tion
Tompkins	wS	26.0	10	5
Millville	"	25.0	10	5
O'Regans	"	23.0	10	5
Cape Anguille.	"	20.0	10	5
Highlands	"	25.0	10	5
St. Fintan's	"	32.0	10	5
St. Fintan's - Stephenville	"	1.9	3	less than 1
Port au Port Peninsula	"	3.2	5	" " "
Stephenville Xing - Corner Brook	"	0.0	-	-
Deer Lake - Trout River	"	0.1	less than 1	-

<u>Collections</u>	<u>Larvae per tree sample</u>	
	Av.	Dev. from 1964
35	8.7	±2.1

Black-headed Budworm, *Acleris variana* (Fern.)--There was no change in the status of the black-headed budworm in western Newfoundland. Numbers remained low and the average larvae per tree sample was about the same as for 1964.

<u>Collections</u>	<u>Larvae per tree sample</u>	
	Av.	Dev. from 1964
6	0.4	±0.1

European Spruce Sawfly, *Diprion hercyniae* (Htg.)--Small numbers of larvae were collected from black and white spruce throughout western Newfoundland. Numbers per tree sample were recorded as follows: 15 on white spruce near Hampden, White Bay; 3 on both black and white spruce at Grand Lake; and only 1 per tree at Ming's Bight, La Scie, Fleur de Lys and Burlington on the Baie Verte Peninsula and near Norris Point, Port au Choix and Roddicton on the Northern Peninsula. Defoliation was negligible.

The majority of larvae collected in 1965 were diseased, indicating that the virus disease, introduced to the Island some 18 years ago, is still an important control factor.

<u>Collections</u>	<u>Larvae per tree sample</u>	
	Av.	Dev. from 1964
67	2.1	±0.6

Larch Sawfly, *Pristiphora erichsonii* (Htg.)--The total area infested by the larch sawfly in District 1 was reduced from 1964. Only three small areas of infestation persisted near Wild Cove Pond, Baie Verte Peninsula; Harry's Brook, and Red Indian Brook, Grand Lake. The following larch sawfly conditions were recorded during the aerial survey:

<u>Location</u>	<u>Area of infestation (sq. miles)</u>	<u>Defoliation (per cent)</u>	<u>Remarks</u>
Wild Cove Pond (Baie Verte Peninsula)	1/8	50	80 acres
Harry's Brook (Grand Lake)	1	90-95	5% trees dead
Red Indian Brook (Grand Lake)	1	75-90	Scattered dead trees

Larch Casebearer, *Coleophora laricella* (Hbn.)--Population levels of this casebearer were low in western Newfoundland, ranging from 2 to 15 larvae per tree sample. Damage was negligible except at O'Regans, Upper Ferry, and North Branch in the Codroy Valley where browning was recorded as light to medium. A summary of sampling data based on the number of casebearers on 30 fascicles per tree at 20-tree sampling stations follows:

Location	Stand vigor	Stand defoliation	No. cases on year- old shoots (Corr.)	
			Av.	Dev. from 1964
Isle aux Morte	U	Nil	0.0	-
Tompkins	V	Trace	1.1	+0.1
O'Regans	MV	10	2.5	-1.8
Upper Ferry	V	40	9.5	-
Overfalls	"	Trace	0.8	-
South Branch	"	Nil	0.0	-0.7
North Branch	MV	15	4.7	+3.3
St. Fintan's	"	Trace	0.6	-
Fishels River	"	"	0.4	-
Agathuna	"	"	0.5	-
Stephenville Xing	"	"	0.4	-1.6
Goose Arm Road	V	Nil	0.0	-0.2
Bonne Bay Road	MV	"	0.0	-0.7
Trout River (Bonne Bay)	"	"	0.0	-

★

U = Unthrifty; V = Vigorous; MV = Moderately vigorous

Birch Casebearer, Coleophora fuscadinella (Zell.)--

This casebearer was found in outbreak numbers on roadside white birch saplings in St. George's District and in the Corner Brook area. No casebearers were found at Cape Ray, O'Regans and St. Theresa (Figure 1).

The most severe injury was recorded in early July near Doyles in the Codroy Valley where one small area of approximately 2 acres was 80% defoliated. Clumps of alders growing in this area also were defoliated about 10%. Extensive defoliation ranging from 20 to 90% occurred along the Trans Canada Highway from Codroy Pond to Robinson's and along local roads in the St. Fintan's, Highlands and Jeffrey's areas. Although roadside white birch trees were most severely damaged, patches of defoliated trees were observed in a cut-over area near Riverbrook. High population levels and severe defoliation occurred on white birch in and around the City of Corner Brook.

It was interesting to note that percentage defoliation recorded in mid-August was less than that recorded in early July. This phenomenon was apparently caused by abnormally luxuriant leaf development and because most feeding damage was caused by

the 1964-65 generation which ceased feeding and pupated prior to mid-July. A comparative summary of defoliation estimates for the two periods follows:

Location	Host	Per cent defoliation		Area affected
		Early July	Mid-August	
Doyles	wB	80	40	2 acres
"	Al	10	5	" "
Tompkins - South Branch (T.C.H.)	wB	5	2	Patchy along T.C.H.
Tompkins - South Branch (T.C.H.)	Al	Trace	Nil	
Lochleven (Codroy Valley)	yB	5	2	1 acre
Lochleven (Codroy Valley)	wB	5	2	" "
Millville-Woodville (Codroy Valley)	wB	5	1	Patchy along local road
Millville-Woodville (Codroy Valley)	yB	Trace	1	Patchy along local road
Riverbrook-St. Fintan's Road	wB	50-90	20-60	Along 3 miles T.C.H.
St. Fintan's Road - Crabbes River	wB	20-50	25	Along 4 miles of local road
Jeffrey's area	wB	50	15-30	Along 2 miles of local road
Robinson's River East	wB	70-80	25-40	Robinson's River east for 2 miles
Stephenville Xing	wB	5-10	5	Roadside
Port au Port	wB	Nil	Nil	Few larvae
Corner Brook	wB	20-90	10-60	Patchy through- out City

Birch Leaf Miner, Fenusa pusilla (Lep.) and the Birch Leaf-Mining Sawfly, Heterarthrus nemoratus (Fall.)--These miners were common on roadside white birch saplings from Doyles to Deer Lake in southwest Newfoundland but significant leaf browning was recorded only on patches of young birch along the Trans Canada Highway from Doyles to Southwest River, along the Fox Island River Road, on the south side of Humber Arm and along the Goose Arm Road (Figure 2). A record of injury by these pests is contained in the following summary:

<u>Location</u>	<u>Degree of browning</u>	<u>Extent of outbreak along roadside</u>
Doyles-Southwest River	Light (5 to 20%)	80 miles
Fox Island River Road	Medium (30%)	6 "
Frenchman's Cove	Light to medium (15 to 30%)	10 "
Goose Arm Road	" " " (10%)	12 "

<u>Collections</u>	<u>Larvae per tree sample</u> Av.
26	21

Alder Leaf Miner, Fenusa dohrnii (Tischb.)--The alder leaf miner was common on speckled alder throughout the District. However, foliage browning was estimated to be only a trace to 10% except near Tompkins where 15% browning occurred over about 20 acres.

OTHER NOTEWORTHY INSECTS

<u>Insect species</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Average larvae per tree sample</u>	<u>No. of collections</u>
<u>Acrididae</u> Grasshoppers	L	Hawkes Bay	0.3	1
<u>Aegeria apiformis</u> (Clerck) Hornet moth	bF	Stag Hill Road	0.3	1
<u>Altica ambiens</u> (Lec.) Alder flea beetle	W	" " "	0.3	1
<u>Anoplonyx luteipes</u> (Cress.) Marlatt's larch sawfly	L	Throughout District	1.3	12
<u>Aphania youngana</u> Med. A leaf miner	wB	Lockleven	4.0	1
<u>Aphidae</u> Aphids	wB, bF, L	Stephenville	87.0	3
<u>Archips packardiana</u> Fern. Fir tortrix	L	Cheeseman's Prov. Park	0.3	1
<u>Archips persicana</u> (Fitch) White-triangle leaf roller	L	South Branch	0.05	1
<u>Archips rosana</u> (L.) European leaf roller	Al	Stephenville	3.0	1
<u>Argyresthia laricella</u> Kft. Larch twig borer	L	Tompkins, Ship Cove	2.0	2
<u>Biston cognataria</u> (Guen.) Pepper and salt moth	wB	Harry's River	0.3	1
<u>Campaea perlata</u> Guen. Fringed looper	L, wB, yB, pCh	St. George's District	0.7	1

OTHER NOTEWORTHY INSECTS (Cont'd.)

<u>Insect species</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Average larvae per tree sample</u>	<u>No. of collections</u>
<u>Caripeta divisata</u> Wlk. Grey spruce looper	wS, bS	Harry's River area	0.7	3
<u>Cerambycidae</u> Long-horned beetles	bF	10-mile Lake	0.3	1
<u>Chrysomela</u> sp. Leaf beetles	W	Pynn's Brook	8.0	1
<u>Chrysomelidae</u> sp. Leaf beetles	W	La Scie	8.0	2
<u>Chrysopidae</u> Green lacewings	wS	10-mile Lake	0.3	1
<u>Cicadellidae</u> Leaf hoppers	wS, wB, L, W	Humber District to St. Barbe North	5.0	7
<u>Cimbex americana</u> Leach. Elm sawfly	wB, Al, W, Mo	St. George's, Humber, St. Barbe and White Bay districts	0.4	13
<u>Croesus latitarsus</u> Nort. Dusky birch sawfly	wB, W	Throughout District	0.8	13
<u>Curculionidae</u> Weevils or snout beetles	bF, L	St. George's, Humber and White Bay districts	0.3	4
<u>Dioryctria reniculella</u> (Grote) Spruce coneworm	bS, wS	St. George's and St. Theresa	0.3	2
<u>Elateridae</u> Click beetles	bS	River of Ponds	0.3	1

OTHER NOTEWORTHY INSECTS (Cont'd.)

<u>Insect species</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Average larvae per tree sample</u>	<u>No. of collections</u>
<u>Eucordylea atrupictella</u> Dietz. A spruce needle miner	wS	Goose Arm Road, Glenburnie	0.8	2
<u>Eupithecia</u> sp. A looper	bF, wS, bS, L	Throughout District	0.3	31
<u>Eupithecia transcanadata</u> McK. A looper	bF, bS, wS	Roddickton Branch Road	0.3	1
<u>Feralia jocosu</u> (Guen.) Green striped caterpillar	bF, bS, wS	Humber and St. Barbe districts	0.4	25
<u>Griselda radicana</u> Wlshm. Micro moth	wS	St. Barbe South and St. George's districts	0.5	5
<u>Heterarthrus nemoratus</u> (Fall.) Birch leaf mining sawfly	wB	Humber and St. George's districts	7	5
<u>Hylobius</u> sp. Root collar weevil	bF	Brig Bay (St. Barbe)	0.3	1
<u>Hyperctis amicaria</u> H.-S. White-spotted looper	Al	St. Theresa (St. George's)	0.3	1
<u>Lygris propulsata</u> A looper	bF	Gull Pond Road	0.3	1
<u>Mindarus abietinus</u> Koch. Balsam twig aphid	bF	White's Road (Stephenville Xing)	33	1
<u>Miridae</u> Plant bugs	wB	Wild Bight	0.3	1

OTHER NOTEWORTHY INSECTS (Cont'd.)

<u>Insect species</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Average larvae per tree sample</u>	<u>No. of collections</u>
<u>Monochamus scutellatus</u> (Say) White-spotted sawyer beetle	wS	Whetstone Point. (Grand Lake	0.3	1
<u>Nematus limbatus</u> Cress. Willow sawfly	W	Humber, St. Barbe and White Bay districts	3	5
<u>Nitidulidae</u> Sap-sucking beetle	W	Brig Bay, Roddickton Branch Road	28	2
<u>Nyctobia limitaria</u> Wlk. Green balsam looper	bF, L, wS, bS	St. George's, Humber and St. Barbe districts	0.5	18
<u>Glene plagiata</u> (Wlk.) Pine tussock moth	wS	Hampden, White Bay	0.3	1
<u>Fentatomidae</u> Stink bugs	bPo, Al	Bowater's Park, Burlington area	2	2
<u>Phalaenidae</u> Owlet moths	L	North Branch, Codroy Valley	0.3	1
<u>Pikonema alaskensis</u> (Roh.) Yellow-headed spruce sawfly	wS, bS	St. George's, Humber, St. Barbe and White Bay districts	0.7	17
<u>Pikonema dimmockii</u> (Cress.) Green-headed spruce sawfly	wS, bS, bF	Throughout district	0.4	32
<u>Pristiphora lena</u> Kincaid Spruce sawfly	wS, bS, bF	St. George's Humber and St. Barbe districts	0.5	6
<u>Recurvaria</u> sp. A needle miner	wS	St. Theresa	0.3	1

OTHER NOTEWORTHY INSECTS (Cont'd.)

<u>Insect species</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Average larvae per tree sample</u>	<u>No. of collections</u>
<u>Semiothisa</u> sp. A looper	wS, bF, L	Throughout western Newfoundland north of St. George's	0.6	26
<u>Solenobia walshella</u> Clem. A bagworm	bS, bF, wS	St. George's, Humber, St. Barbe and White Bay districts	0.3	7
<u>Sphingidae</u> Sphinx moth	W	Westport	0.3	1
<u>Stilpnotia salicis</u> (L.) Satin moth	lPo, bPo	Humber and St. George's districts	2	2
<u>Syngrapha alias</u> (Ottol.) Spruce climbing cutworm	bS, wS, bF	Serpentine Road (Bowater's Gate)	0.3	3
<u>Syngrapha selecta</u> (Wlk.) Verdigris autograph	wS, bF	Humber and St. George's districts	0.3	4
<u>Syneta</u> sp. A beetle	wS, bF	St. Barbe District	0.3	2
<u>Tetraphleps</u> sp. A predator	bF, wS	St. George's and St. Barbe districts	2	6
<u>Zeiraphera</u> sp. A budmoth	wS	Flat Bay Brook	1	1

DISEASE CONDITIONS

There was no unusual incidence of disease infection in western Newfoundland in 1965. Needle rusts of spruce which caused conspicuous yellowing of foliage over extensive areas in 1964 decreased to endemic levels. Needle casts of larch and balsam fir were common throughout the District. Leaf and twig blight of poplar and ink spot of poplar occurred at widely separated locations. The incidence of *Armillaria* root rot was high on balsam fir in balsam woolly aphid infested stands.

Needle Rust on Spruce, *Chrysomyxa ledicola* (Pk.) and *C. ledi* (A & S) de Bary--The intensity of these rusts declined throughout the District and only an occasional severely infested tree was recorded. However, a number of immature black spruce near Main Dam, Grand Lake, and near Jeffrey's and St. Fintan's were noted to have thin foliage as the result of severe browning by these rusts in 1964.

Needle Cast of Balsam Fir, *Bifusella faullii* Darker--This needle cast was medium to severe on immature and mature balsam fir at six locations along the north shore of Grand Lake from the northeast end of Glover Island to Main Dam. Only one or two trees were infected at each location except near Baker's Brook where five trees had 60 to 70% of their foliage affected. This disease also occurred in moderate intensity on mature trees near Codroy Pond and on immature trees near Brig Bay. *Lophodermium* sp. was recorded as light at River of Ponds on the Northern Peninsula and severe on a few mature balsam fir near Codroy Pond.

Needle Cast of Larch, *Hypodermella laricis* Tub.--The most apparent injury by this disease was recorded in small immature stands of larch near Dribble Brook, St. George's; near Main Dam, Grand Lake; and southwest of the narrows between Birchy and Sandy Lakes where 30 to 50% of foliage was affected. Light infections occurred on the Port au Port Peninsula and along the Goose Arm and Bonne Bay roads.

Leaf and Twig Blight of Poplar, *Pollaccia radiosa* (Lib.) Bald. & Cif. *P. elegans* Serv.--Light to moderate injury was recorded on roadside trembling aspen saplings along the Lockleven Road in the Codroy Valley. Light injury also occurred over 2 acres of young aspen near Baker's Brook along the north shore of Grand Lake.

Ink Spot of Aspen, *Ciborinia whetzellii* (Seav.)--Medium to severe browning of trembling aspen leaves occurred at three isolated locations in western Newfoundland.

Browning of pole-size and mature aspen was severe, 75 to 90% in a 2-acre stand on the north shore of Grand Lake, approximately 8 miles east of Glover Island.

Two areas of infection on the Baie Verte Peninsula were recorded at Southern Arm between Seal Cove and Middle Arm, and along the shore of Western Arm east of Bear Cove. One square mile was infected at each location and the degree of browning ranged from 30 to 50%.

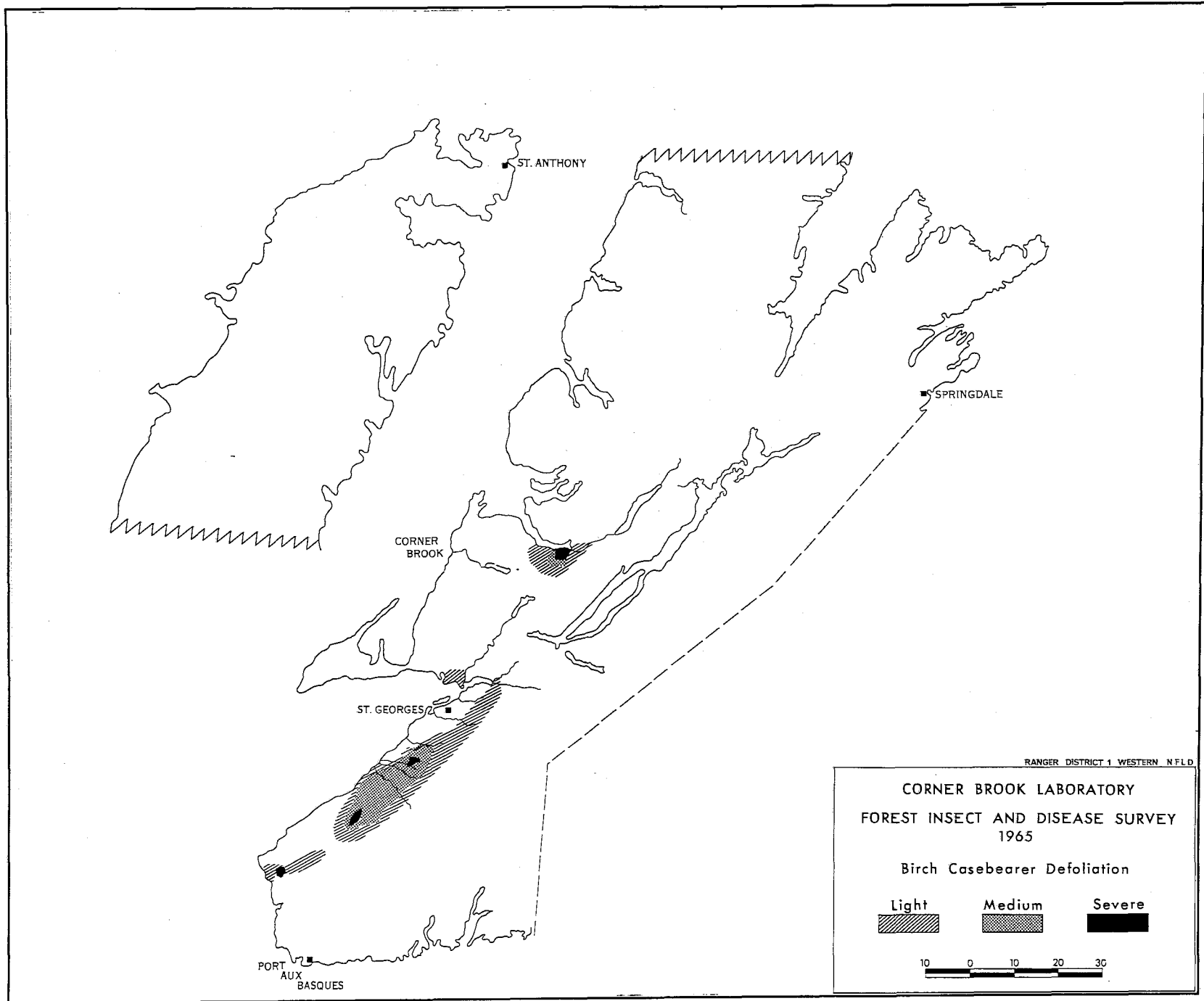
Armillaria Root Rot, *Armillaria mellea* (Vahl ex Fr.)
Kummer--This root rot was common on balsam fir, black spruce and white spruce in District 1. Roots of dead and dying aphid infested balsam fir trees were examined along randomly selected 22.3 chain lines in aphid survey plots at Bottom Brook, Barachois Park, Flat Bay Brook, Fishel's River and Crabbes River. This survey showed that 75% of the aphid infested trees were infected by *Armillaria* root rot.

OTHER NOTEWORTHY DISEASES

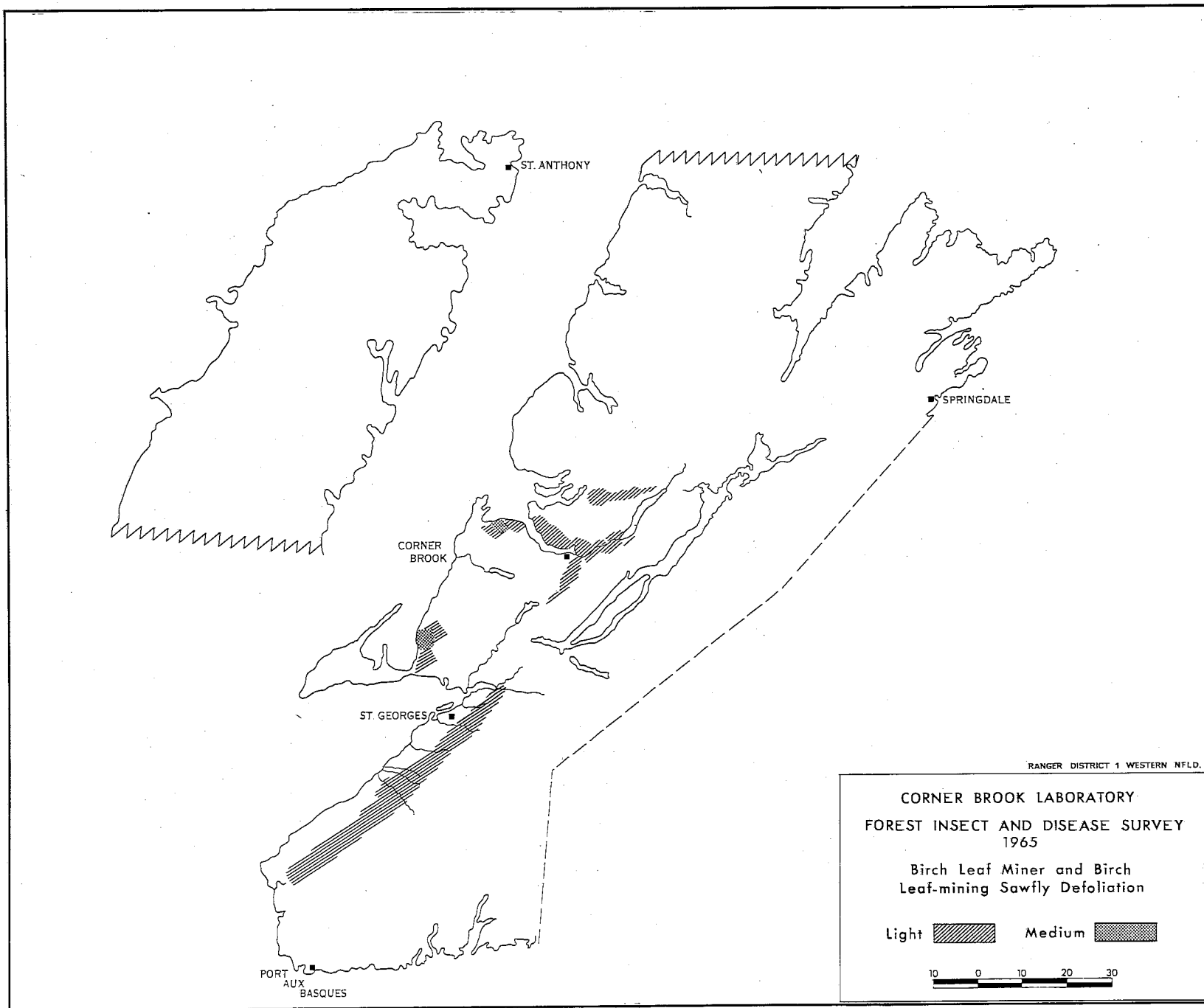
<u>Organism</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Remarks</u>
<u>Arceuthobium pusillum</u> Pk. Eastern dwarf mistletoe	bS	Throughout District	Caused numerous witches' brooms on bS.
<u>Dibotryon morbosum</u> (Schw.) Theiss. and Syd. Black knot of cherry	pCh	" "	Severe in Codroy Valley
<u>Gloeosporium apocryptum</u> Ell. & Ev. Anthracnose of hardwoods	rm, moM	" "	Moderate intensity in most parts of District.
<u>Melampsorella carvophyllacearum</u> Schroet. Yellow witches' broom of balsam fir	bF	" "	Prevalent on both immature and mature trees.
<u>Pucciniastrum pustulatum</u> (Pers.) Diet. and <u>Milesia</u> sp. Needle rust of balsam fir	bF	" "	Common but light on current year's needles of bF regeneration.
<u>Rehmiellopsis balsameae</u> Walterm. Tip blight of balsam fir	bF	Crabbes River, Gallants & Brig Bay	Light on new shoots of immature trees.

1

FIGURE



FIGURE



SECTION II
FOREST INSECT AND DISEASE SURVEY
DISTRICT 2, CENTRAL NEWFOUNDLAND

L. J. Clarke

INTRODUCTION

Survey activities were carried out in the forested areas of central Newfoundland from May 18 to November 25. The summer was warm and dry after a cool, wet spring, and conditions were apparently favourable for insect development. The first month of the season was spent establishing larch sawfly study plots in Terra Nova National Park and near Glovertown, and preparing trap lines in the shrew study plots near Hall's Bay and Exploits Dam. The field-collecting program began on June 28 and terminated on September 2. A total of 406 insect and 30 disease samples was collected during the period. Following the collecting season, 10 hours and 35 minutes were flown in a Super-cub aircraft on general reconnaissance and mapping flights over District 2, and 26 hours and 40 minutes were flown in a Sikorsky helicopter on intensive detection, assessment and mapping flights to check selected stands for the balsam woolly aphid. Early in October, 2,000 larch sawfly cocoons were collected to determine parasitism. A week was spent in District 3, Eastern Newfoundland, investigating a rust disease in white spruce stands between Portugal Cove and Pouch Cove, and sampling pine plantations on the Avalon Peninsula. The writer also assisted E. M. Haines on the shrew population-dispersal project and W. C. Parrott with the reclassification of trees in balsam woolly aphid mortality plots.

The major insect problems in the District were caused by the balsam woolly aphid, black-headed budworm, larch sawfly, and the birch leaf miner and birch leaf-mining sawfly. Isolated spots of satin moth defoliation were observed for the second consecutive year at West Lake and along the Noel Paul River. An undetermined leaf miner caused severe damage to immature trembling aspen near South Brook, Hall's Bay.

There was a marked reduction in the incidence and intensity of needle rusts on spruce from 1964 and no serious disease conditions were reported for other organisms. However, severe ice and snow damage occurred at several locations in the District.

Growth studies were continued in the special phenology plot near Badger. Current growth of selected north lateral branches on 10 balsam fir were measured at weekly intervals. The average shoot growth for these trees is summarized as follows:

Location	Date of average growth		
	25%	50%	Total
Badger	June 22	July 2	July 26

INSECT CONDITIONS

Balsam Woolly Aphid, *Adelges piceae* (Ratz.)--The balsam woolly aphid continued to be the major forest pest in central Newfoundland and new spot outbreaks were discovered on immature balsam fir along the north shore of Gander Lake between Glenwood and Gander, 11 miles southwest of Badger along the Badger-Buchans Road, and on Thwart and Sivier islands in Notre Dame Bay. There were minor extensions of the infestation around the Bay of Exploits and in the Norris Arm area. The status of aphid infestations in the Red Indian Lake and Lloyds River watersheds changed only slightly. For additional information on balsam woolly aphid conditions, see Section IV, "Special Survey Balsam Woolly Aphid (*Adelges piceae* (Ratz.))."

Black-headed Budworm, *Acleris variana* (Fern.)--Black-headed budworm population levels increased to infestation proportions in black spruce and balsam fir stands across the northern section of the District. The most extensive outbreak occurred over approximately 500 square miles of pure black spruce and black spruce-balsam fir forest between Lewisporte and Gander River, including O'Brien's Lake, Island Pond and Salmon Pond (Figure 3). Defoliation of current year's foliage was estimated to be 80% on both black spruce and balsam fir over 24 square miles at the centre of this infestation. Otherwise, the intensity of the infestation varied and defoliation ranged from 10 to 65%

A light to moderate infestation occurred on immature black spruce between Point Leamington and West Arm, New Bay. This infestation covered 50 square miles and defoliation ranged from 10 to 35%. Stand composition was estimated at 95% black spruce and 5% balsam fir (Figure 4).

The intensity of the infestations at Hall's Bay and near Sandy Lake, Badger, was reduced from 1964 and defoliation was not more than 20% of current year's foliage on immature and mature black spruce.

Several small outbreaks were also recorded and details are included in the following summary:

The Status of Black-headed Budworm Conditions by Locations in
Central Newfoundland

Location	Stand composition (per cent)	Per cent defoliation	Area affected
South Pond (Hall's Bay)	bS 98 L 2	20	5 square miles (12 mi. along T.C. Highway)
Gull Pond (Hall's Bay)	bS 80 L 10 Bog 10	15	5 sq. miles
Sandy Lake (Badger)	bS 90 bF 5 L 5	20 20	2 " " (4 mi. along Sandy Woods Road)
South Twin Lake	bS 50 bF 40 L 10	15 30	2 sq. miles (3 small spots)
Northern Arm (Notre Dame Bay)	bS 98 bF 2	25 30	2 square miles
Point Leamington to West Arm-New Bay	bS 95 bF 5	10-30 10-35	50 " "
From six miles north of Northern Arm to Point Leamington	bS 95 bF 5	30 25	10 square miles (8 miles along secondary road)
Lewisporte-Brown's Arm- Lawrenceton-Burnt Arm Road (3 miles from Lewisporte)	bS 90 bF 10	10 10	1 square mile (Half a mile along local road)

Location	Stand composition (per cent)	Per cent defoliation	Area affected
Lewisporte-Embree- Little Burnt Bay Road	bS 95 wB 5	25	10 square miles (Five and a half miles along local road)
Boyd's Cove to Victoria Cove Road	bS 70 bF 30	40 65	9 square miles
Burnt Lake, Indian Arm Pond, Salmon Pond across Gander River to Jonathan's Pond to Weirs Pond Brook to Gander Bay east to Soulis Lake	bS 60 bF 10 L 10 wB 20	30-80 40-80	480 " " (24 square miles 80% defoliated)
Between Butt's Pond and Square Pond	bS 80 bF 10 L 5 wB 5	10-30 10-60	20 square miles (Current logging in this area)
Joe's Brook - Gander Lake	bS 90	10-15	5 square miles
Mt. Peyton - Careless Brk.	bS 100	30	3 " "
Three Brook - Crooked Lake (Southeast of G. Falls)	bS 90 bF 5 wB 5	25 30	2 " "
Stoney Brook (Southeast of Grand Falls)	bS 80 bF 10 wB 10	20 20	1 " "
Sandy Brook-West Lake	bS 60 bF 30 wB 5 tA 5	20 20	2 " "

Larch Sawfly, *Pristiphora erichsonii* (Htg.)--Larch sawfly infestations persisted in widely separated stands of larch in central Newfoundland (Figure 5). However, the total infested area was reduced from 1964. The largest and most severe outbreaks occurred in the Buchans area along the north side of Red Indian Lake and near the mouth of Victoria River where 90 to 95% defoliation was recorded. Infestations have persisted in these general stands around Red Indian Lake for the past 6 years.

Smaller outbreaks extending over less than 1 square mile were mapped near Dawe's Pond in the South Brook Watershed and at Soulis Pond near Gander. The following summary represents larch sawfly conditions in central Newfoundland for 1965:

Location	Area of infestation (sq. miles)	Defoliation (per cent)	Remarks
Dawe's Pond - Hall's Bay	1	90	10% trees dead
Sandy Brook - Red Indian Lake	2	30	90% L - 10% bS
Buchans - Shanadithit - Red Indian Lake	10	95	60% L - 40% bS
Harbour Round - Victoria River - Red Indian Lake	15	95	80% L - 20% bS
Clench Brook - Halfway Mtn. Red Indian Lake	5	90	90% L - 10% bS
Soulis Pond - Gander Lake	1	30	90% L - 10% bS

European Spruce Sawfly, *Diprion hercyniae* (Htg.)--Larvae of this sawfly were common in collections taken from spruce throughout central Newfoundland. However, population levels remained about the same as for 1964. The largest numbers were taken from black and white spruce along Price (Nfld.) Pulp and Paper woods roads between Exploits Dam and Victoria Lake in the Millertown Woods Division where up to 10 larvae per tree were collected from immature black spruce and up to 5 from white spruce. An average of 3 larvae per tree was collected along Rattling Brook, Bishop's Falls, where high population levels were recorded in 1963. Diseased larvae were

common in collections indicating continuing activity of the virus disease introduced as a control measure some 18 years ago.

<u>Collections</u>	<u>Larvae per tree sample</u>	
	Av.	Dev. from 1964
93	2	-1

Larch Casebearer, Coleophora laricella (Hbn.)--Larval counts were low in all larch sampling stations for the third consecutive year. A summary of sampling data based on the number of casebearers on 30 fascicles per tree at 20-tree sampling stations follows:

<u>Location</u>	★ Stand vigor	Stand defoliation	<u>No. cases on year-old shoots (Corr.)</u>	
			Av.	Dev. from 1964
Grand Falls	V	Light	0.0	-0.1
Roberts Arm	MV	"	0.2	+0.2
Hall's Bay	MV	"	0.8	-0.03
6 miles from Badger (Buchans Rd.)	V	"	0.0	-0.1
Buchans	MV	"	0.0	-0.1
4 miles S.W. Buchans Jct.	MV	"	0.0	--
Lake Ambrose	V	"	0.0	--
2 miles N. Badger (Hall's Bay Rd.)	MV	"	0.0	-0.1
Gambo	MV	"	0.1	+0.1
Gander	MV	"	0.2	+0.1

★

V = Vigorous; MV = Moderately vigorous

Satin Moth, Stilpnotia salicis (L.)--Defoliation estimated at 95% was observed in a 0.5 acre stand of mature trembling aspen between Tom Joe Brook and West Lake in the Badger area. Medium defoliation was also recorded on mature aspen shade trees in the town of Botwood. Otherwise, population levels were the lowest in several years.

<u>Collections</u>	<u>Larvae per tree sample</u>	
	Av.	Dev. from 1964
1	.3	-11.7

Birch Leaf Miner, Fenusa pusilla (Lep.) and Birch Leaf-Mining Sawfly, Heterarthrus nemoratus (Fall.)--Population levels of these leaf miners increased on roadside white birch and the degree of browning ranged from 10 to 90%. The most severe damage was recorded between Gambo and Benton. Medium browning also occurred between Jumper's Brook and Sandy Point near the mouth of Exploits River (Figure 6).

Collections

45

European Alder Leaf Miner, Fenusa dohrnii (Tisch.)--This leaf miner caused medium to severe browning of speckled alder foliage along the Trans Canada Highway from Lewisporte to Gander, and along secondary roads in the Bishop's Falls, Badger and Millertown area. Browning ranged from 40 to 60% throughout the District.

Collections

5

OTHER NOTEWORTHY INSECTS

<u>Insect species</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Average larvae per tree sample</u>	<u>Remarks</u>
<u>Altica ambiens</u> (Lec.) Alder flea beetle	Al	Sandy Lake Road	35.0	1 collection
<u>Anacamptis innocuella</u> Z. Poplar leaf roller	tA	Bishop's Falls	1.0	Low numbers
<u>Anoplonyx luteipes</u> (Cress.) Marlatt's larch sawfly	L	Throughout District	7.0	" "
<u>Aphidea</u> Aphids	Do	South Brook	100.0	3 collections
<u>Caripeta divisata</u> Wlk. Gray spruce looper	bS	Throughout District	.5	Low numbers
<u>Chrysomela falsa</u> Brown A willow leaf beetle	W	Hall's Bay Road	7.0	13 collections
<u>Cicadellidae</u> Leaf hoppers	Do	Badger-Grand Falls Road	2.0	2 collections
<u>Corythucha</u> sp. Lacebugs	Al	Lewisporte	29.0	Light damage
<u>Groesus latitarsus</u> Nort. Dusky birch sawfly	wB	Roberts Arm	.7	3 collections
<u>Eucordylea atrupictella</u> Dietz. A spruce needle miner	bS	Throughout District	1.0	Low numbers
<u>Feralia jocosa</u> (Guen.) Green-striped caterpillar	bS	Hall's Bay Road	.3	" "

OTHER NOTEWORTHY INSECTS (Cont'd.)

<u>Insect species</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Average larvae per tree sample</u>	<u>Remarks</u>
<u>Griselda radicana</u> Wlsh. Micro moth	bS	South Brook	1.0	43 collections
<u>Nematus (P.) limbatus</u> (Cress.) Willow sawfly	W	Roberts Arm	4.0	Light damage
<u>Neodiprion abietis</u> complex Balsam fir sawfly	bF	Throughout District	.4	Low numbers
<u>Nyctobia limitaria</u> Wlk. Green balsam looper	bS	" "	.3	9 collections
<u>Nymphalis antiopa</u> (L.) Spiny elm caterpillar	W	Point Leamington	2.0	1 collection
<u>Pikonema alaskensis</u> (Roh.) Yellow-headed spruce sawfly	bS	Throughout District	.7	35 collections
<u>Pikonema dimmockii</u> (Cress.) Green-headed spruce sawfly	bS	" "	.6	43 "
<u>Pristiphora geniculata</u> (Htg.) Mountain ash sawfly	Mo	Botwood	127.0	6 "
<u>Pristiphora lena</u> Kincaid A spruce sawfly	bS	Throughout District	.4	Low numbers
<u>Taniva albolinena</u> (Kft.) A spruce needle miner	bS	" "	1.0	32 collections
<u>Zeiraphera ratzburgiana</u> Ratz. Spruce budmoth	wS	Botwood	2.0	2 "

DISEASE CONDITIONS

Armillaria Root Rot, *Armillaria mellea* (Vahl ex Fr.)
Kummer--Severe damage to black spruce regeneration was recorded for the second consecutive year along a 4-mile section of the Sandy Lake-Badger Road. The damage has now extended an additional mile. Crown mortality occurred in about 5% of the predominate black spruce stands and 2% of the trees were killed. Top mortality also occurred on 2% of balsam fir and larch in the stand.

Snow Blight of Conifers, *Phacidium* sp.--Snow blight fungus was observed on immature black spruce along a narrow 1-mile section of the Hall's Bay Road near Crooked Lake. Trees in this area were severely infested with needle rust in 1964.

Leaf and Twig Blight of Poplar, *Pollaccia radiosa* (Lib.)
Bald. and Cif. and *P. elegans* Serv.--Leaf and twig blight was widespread on immature roadside trembling aspen throughout central Newfoundland. The heaviest infection occurred along the Hall's Bay and Campbellton-Loon Bay roads where 70% of the leaders had wilted by late August.

Ink Spot of Aspen, *Ciborinia whetzellii* (Seav.) Seav.--This disease caused 90% browning to the majority of trees in a 5-acre stand of immature trembling aspen along the Northern Arm-Point Leamington Road.

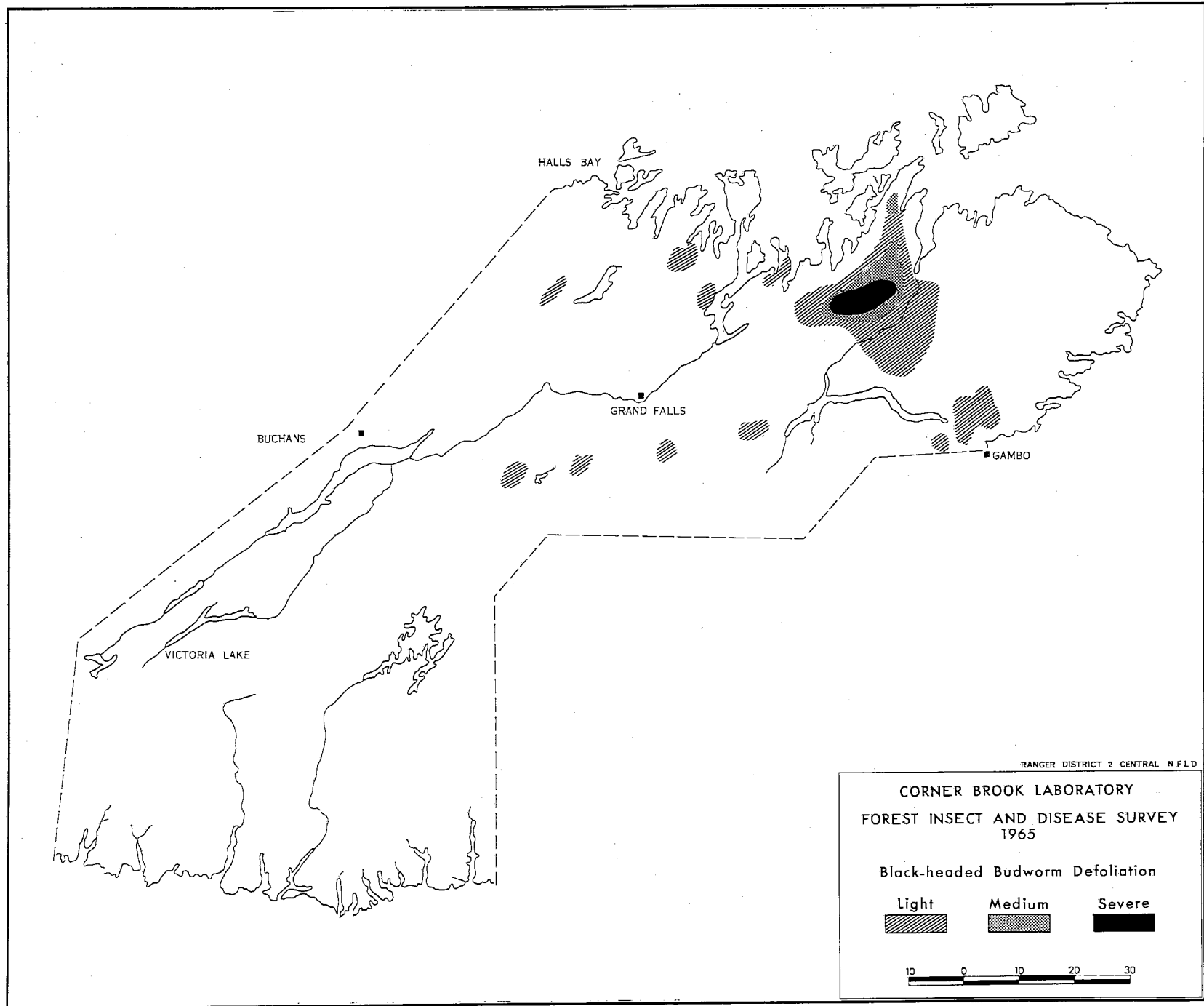
Anthracnose of Hardwoods, *Gloeosporium* sp.--Anthracnose of red and mountain maple caused by *Gloeosporium apocryptum* Ell. & Ev. occurred in moderate intensity along Long Lake Road and at South Brook, Hall's Bay.

Ice and Snow Damage--During the winter of 1964-65, ice and snow damaged approximately 20 square miles of coniferous forest at several locations in central Newfoundland. Broken tops and branches were most conspicuous from the air near Mt. Peyton, Lockport, Glover's Harbour, around South Arm-New Bay, and along the Trans Canada Highway from Notre Dame Junction to Lake O'Brien. Immature and mature black spruce suffered the most severe damage, although larch, white birch and trembling aspen were also affected (Figure 7). Ice and snow damage conditions for 1964-65 are contained in the following summary:

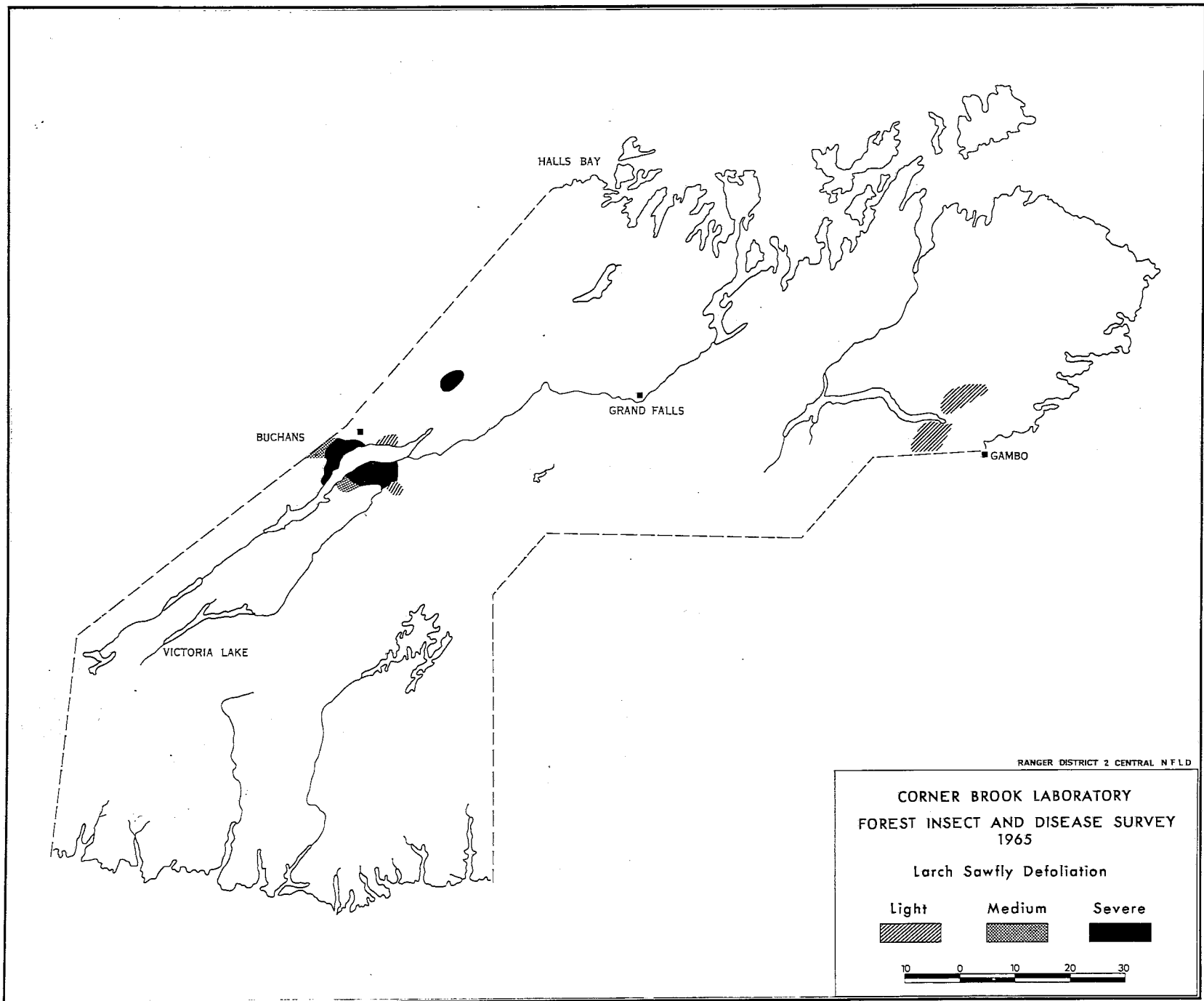
<u>Location</u>	<u>Area (sq. miles)</u>	<u>Per cent damage</u>	<u>Stand composition</u>
Lockport - Glover's Hbr.	2	20	80 bS, 20 L
West Arm - Pt. Leamington Road	1	10	60 bS, 30 wB, 10 tA
West Side of South Arm, New Bay	2	20	60 bS, 40 wB
East side of South Arm, New Bay	3	20	40 bS, 40 wB, 20 tA
6 miles north of Northern Arm	2	10	70 bS, 20 wB, 10 tA
Dowd Pond, South of Mt. Peyton	10	25	90 bS, 10 L

OTHER NOTEWORTHY DISEASES

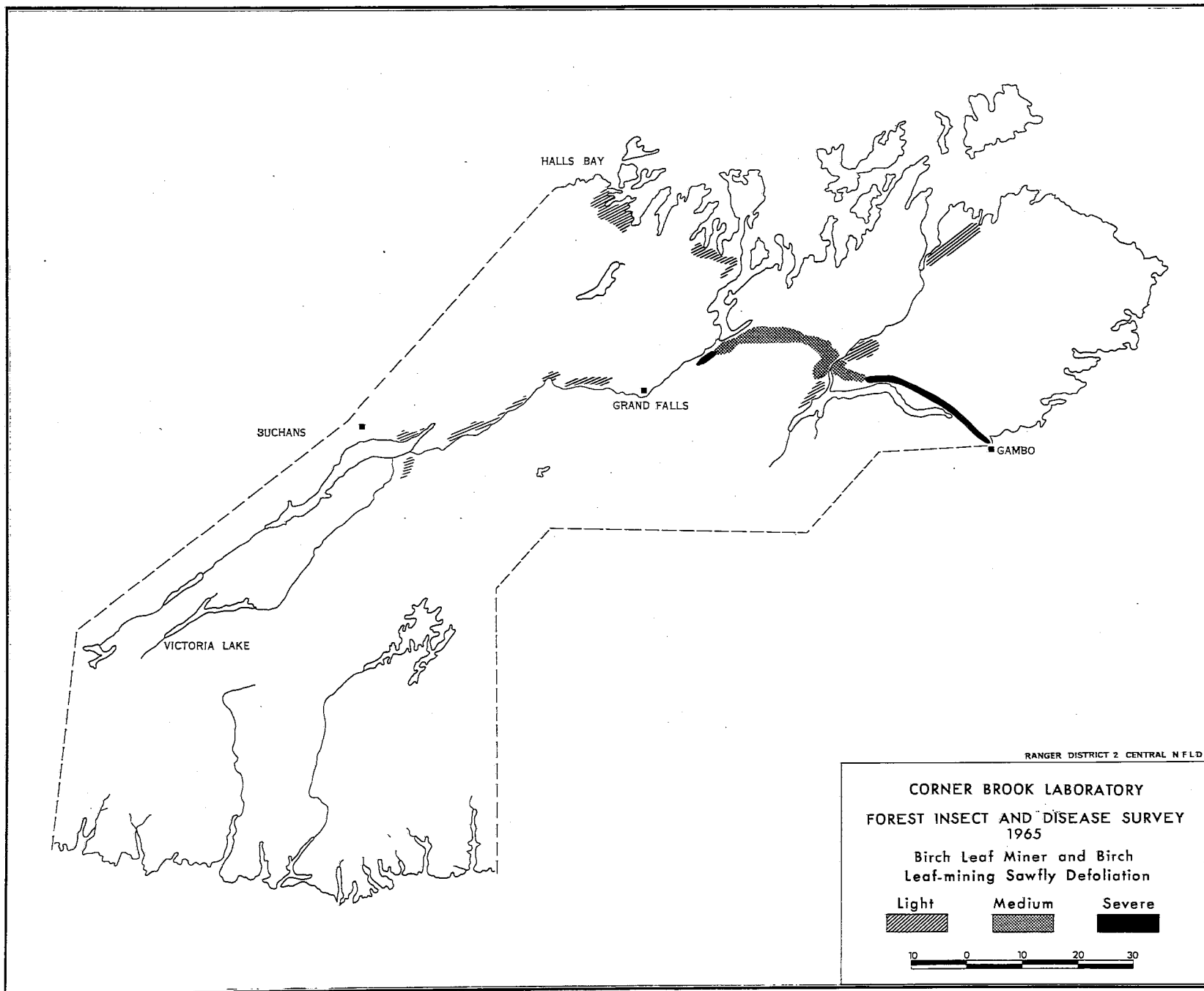
<u>Organism</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Remarks</u>
<u>Arceuthobium pusillum</u> Pk. Eastern dwarf mistletoe	bS	Badger-Buchans Road	10 - 20% of trees infested along 5 miles of road.
<u>Chrysomyxa arctostaphli</u> Diet. Yellow witches' broom	bS	Badger	Common black spruce.
<u>Chrysomyxa ledicola</u> (Pk.) Lagerh. Needle rust	bS	Victoria Lake	1 acre infested.
<u>Coccomyces hiemalis</u> Higg. Shot hole of cherry	cCh	Botwood Road	60% foliage damaged.
<u>Cronartium ribicola</u> J.C. Fischer White pine blister rust	wP	Throughout District	Common.
<u>Dibotryon morbosum</u> (Schw.) Theiss. and Syd. Black knot of cherry	pCh	" "	Severe damage.
<u>Gloeosporium apocryptum</u> Ell. & Ev. Anthracnose of maple	rM	Hall's Bay	Light damage.
<u>Lophodermium</u> sp. Needle cast	bF	Victoria Lake	" "
Winter drying of conifers	bF	" "	Light damage south side of lake.



FIGURE



FIGURE



FIGURE

4



An estimated 80 per cent of current year's foliage was defoliated from immature balsam fir by *Acleris variana* Fern. larvae near First Pond, Boyd's Cove.
August, 1965

Photo by L. J. Clarke

FIGURE

7



Severe ice and snow damage to hardwoods and conifers near West Arm, New Bay.
July, 1965

Photo by L. J. Clarke

SECTION III
FOREST INSECT AND DISEASE SURVEY
DISTRICT 3, EASTERN NEWFOUNDLAND

E. M. Haines

INTRODUCTION

The 1965 field season began on May 18 with clearing and preparing trap lines in larch sawfly and shrew study plots near St. George's, Hall's Bay, Exploits Dam, Glovertown and in the Terra Nova National Park. A line trapping program was then carried out in the St. George's and Exploits Dam shrew release plots to determine spring shrew population levels. The forest insect and disease collecting program commenced on June 29 and continued until August 25 when the shrew population and dispersal studies were again conducted for approximately 3 months until November 19. Eighteen thousand miles were travelled in departmental vehicles on survey activities and on the shrew population-dispersal project, and approximately 1600 miles were flown on aerial surveys. A total of 288 insect and 23 disease samples was collected.

Early in the season the weather was wet and cool throughout the District. However, relatively dry conditions with average temperatures prevailed after the first week of July.

Insect population levels and the incidence of tree diseases were reduced from 1964. A new balsam woolly aphid infestation was discovered between Placentia and Northeast River on the Avalon Peninsula and small boundary changes were recorded around the infestation in Terra Nova National Park. Black-headed budworm infestations terminated in all areas and populations of the balsam fir sawfly, European spruce sawfly and other defoliators of conifers were reduced to endemic levels. Birch leaf miners and birch leaf-mining sawflies continued to cause light to severe injury to roadside white and yellow birch reproduction over a wide area of the District. Mountain ash sawfly numbers varied from low to high on both ornamental and natural grown mountain ash.

G. L. Warren and W. C. Parrott conducted a survey on the status of root weevils, Hylobius spp., in coniferous plantations in May. Mr. Parrott also carried out general sampling in the District between June 28 and July 9 while the writer was on annual leave. Special collections of Tetrphleps, Pentatomidae and Miridae were made for D.G. Bryant.

Improvements to the Department's property at Clarenville included the installation of a new deep-well pump, installation of an additional kitchen window, placing of wallboard on two rooms, and the erection of new outside steps.

INSECT CONDITIONS

Balsam Woolly Aphid, *Adelges piceae* (Ratz.)--A new balsam woolly aphid outbreak was discovered between Placentia and North East River on the Avalon Peninsula and a few recently infested trees were found up to two and one half miles east of the 1964 infestation boundary in Terra Nova National Park. "Gout" and "stem attack" symptoms were more prominent around the perimeter of the infestations at Bellevue Beach; near Swift Current and between Boat Harbour and Marystown on the Burin Peninsula. For additional information on balsam woolly aphid conditions see Section IV, "Special Survey Balsam Woolly Aphid (*Adelges piceae* (Ratz.))."

Black-headed Budworm, *Acleris variana* (Fern.)--Populations of the black-headed budworm declined to endemic levels in eastern Newfoundland. The series of infestations that persisted over large portions of the District from 1958 to 1964 collapsed in 1965. However, a number of outbreaks were reported throughout central Newfoundland in 1964 and 1965, following an east to west trend of infestation distribution similar to that for the 1946-52 period. A summary of black-headed budworm conditions in eastern Newfoundland for the 1958-64 period is contained in the following paragraphs and table:

A slight increase in black-headed budworm larval numbers was recorded in the Windsor Lake-St. John's area on the Avalon Peninsula in 1958. This outbreak continued to intensify and spread in the same general area in 1959. During the following year the outbreak had spread to Whitbourne and the Salmonier and Colinet River valleys. Increases in population levels also were recorded near Fortune and Fairhaven on the Burin Peninsula. By 1961, coastal sections around Bay d'Espoir and its watersheds had been attacked and the North Harbour River Valley had also been infested. In 1962, the budworm had spread to the Burgoyne's Cove area along the north side of Smith Sound and near Hickman's Harbour on Random Island, Trinity North. Minor outbreaks also appeared near Stock Cove and Port Rexton on the Bonavista Peninsula. Other infestations occurred on the east coast of the Burin Peninsula from Swift Current to Marystown, including the Sandy Harbour, Paradise,

Northeast Nonsuch and Bay de l'Eau watersheds. In 1963, infestations declined on the Avalon Peninsula but the insect continued to spread along the south coast into the Hermitage and Fortune Bay areas; around Bay d'Espoir; and near Spanish Room and Marystown on the Burin Peninsula. New outbreaks appeared at Northeast and Southeast rivers near Placentia on the Avalon Peninsula in 1964. However, these outbreaks were short-lived and terminated in 1965.

Although defoliation was severe no extensive top killing or tree mortality was recorded during the history of the infestations. Crown mortality reached a high of 10% over approximately 50 acres of mature and overmature balsam fir near Morrisville, Bay d'Espoir. Scattered dead trees were found throughout stands in the coastal sections of Bay d'Espoir, in the Salmonier River Valley, and around Bay de l'Eau. Estimates of tree mortality were not made for the latter two areas because trees were continually removed in selective and salvage cutting. Larval collections for the District were:

<u>Collections</u>	<u>Larvae per tree sample</u>	
	Av.	Dev. from 1964
57	1.2	-7.7

A comprehensive summary of black-headed budworm conditions for 1958 through 1964 follows:

A Summary of Black-headed Budworm Conditions in Eastern Newfoundland for the period 1958 to 1964 inclusive

Location	Date outbreak commenced	Date outbreak terminated	Area infested	Forest composition	Defoliation (per cent)	Damage and remarks
Outer Cove, Middle Cove, Logy Bay, Torbay Road, Donovans, and Topsail (Avalon Peninsula)	1958	1961		bF, wS	10 and 5	Light damage
Octagon Pond, Windsor Lake (Avalon Peninsula)	1959	1961		bF	10 to 30	" "
Fortune, Fairhaven (Burin Peninsula)	1960			bF	1 to 5	" "
Colinet River, Admiral's Beach, Colinet and Whitbourne (Avalon Peninsula)	1960	1964	5 to 6 mi.	bF, S, yB	50 to 70	Predominately bF
	1960	1964		bF, S	50 to 70	" "
	1960	1964		bF, S, yB	50 to 70	" "
Salmonier River	1960	1964		bF, S, yB	30 to 90	Mature and immature
North Harbour River (Avalon Peninsula)	1961	1964	10 sq. mi.	bF, bS, wS	30 to 60	Severe outbreaks
St. John's to Chamberlains (Avalon Peninsula)	1961	1962		wS	20 to 25	" "
Bay d'Espoir	1961	1965	100 sq. mi.	bF, 75% S, 10% yB, 15%	60 to 80	Severe outbreaks, confined mostly to river valleys

A Summary of Black-headed Budworm ... (Cont'd.)

Location	Date outbreak commenced	Date outbreak terminated	Area infested	Forest composition	Defoliation (per cent)	Damage and remarks
Pouch Cove, Portugal Cove, Holyrood (Avalon Peninsula)	1962					Light damage
East coast of Burin Peninsula south from Swift Current to Marystown in- cluding Sandy Harbour River, Paradise River, N.E.Nonsuch River, Bay de l'Eau River (Burin Peninsula)	1962	1965		bF, 60% bS & wS 30% Hardwoods 10%	5 to 50	1963 - 30 to 90%
Stock Cove and Port Rexton (Bonavista Peninsula)	1962	1964		bF		Light damage
George's Brook to Burgoyne's Cove (Smith Sound)	1962	1964	25 sq.mi.	bF, 75% wS, 10% bS, 10% L, 5%	40 to 70	Predominately immature stands
Hickman's Harbour (Random Is.)	1962	1964	5 " "	bF, 75% S, 20% L, 5%	40 to 70	Immature stands
South Coast: Hermitage and Fortune Bay areas including Mal Bay Brook and Bay du Nord River	1963	1965		Predominately bF		Severe outbreaks
North East River	1964	1965		bF, bS, wS	40	Predominately bF
South East River (Avalon Peninsula)	1964	1965		bF, bS, wS	40	" "

Spruce Budmoth, Zeiraphera ratzeburgiana Ratz.--Larvae of this insect were common and usually found in association with black-headed budworm and micro-moth larvae on white and black spruce and balsam fir along coastal sections of District 3. However, population levels were low, averaging 2.2 larvae per tree sample, and defoliation was less than 2% of current year's shoots. The status of budmoth conditions in eastern Newfoundland is summarized as follows:

Location	Host(s)	Average larvae per tree sample	Per cent new shoots infested	Per cent defoliation
Port Blandford - Clarenville	bs	1.8	3	Less than 1
Lethbridge - Southern Bay	ws	2.0	3	" " "
George's Brook - Clifton	ws, bs	2.3	3	" " "
Random Island	ws, bs	2.1	3	" " "
Goobies to Whitbourne	ws	2.3	3	" " "
Whitbourne - New Harbour, Trinity Bay	ws	6.0	5	2 to 4
Burin Peninsula (South of Boat Harbour)	ws	1.0	2	Less than 1

Balsam Fir Sawfly, Neodiprion abietis Complex--Populations of this insect reached their lowest level in several years with the termination of all known infestations in District 3. The Goobies-Come-By-Chance infestation, which started in 1961, terminated in 1964 and covered an area of approximately 15 square miles of predominately pole size balsam fir trees. Tree mortality was recorded as 50% with an additional 30% of top-killing over a three-square mile area. Tree mortality was higher in the open-grown stands on the slopes than in the dense stands on the lower levels of the area. Foliage on the majority of the remaining trees in the area appeared thin as the result of repeated defoliation that ranged from 10 to 90% of old foliage (Figures 8 and 9).

The infestation in the Freshwater Pond watershed on the Burin Peninsula terminated after causing severe defoliation in

predominately balsam fir stands for 3 consecutive years. Although the infestation covered approximately 20 square miles of immature balsam fir, white and black spruce forest, severe damage and mortality was confined to pockets where balsam fir predominated. A half-mile cruise along the west side of Freshwater Pond showed that 93% of the trees were dead as the result of repeated attacks by the balsam fir sawfly. This stand was also infested by the balsam woolly aphid. The owner of the property has commenced a salvage and replanting program in a section of the area which is used primarily for recreational purposes.

<u>Collections</u>	<u>Larvae per tree sample</u>	
	Av.	Dev. from 1964
3	0.7	-18.1

Root Collar Weevil, Hylobius warreni Wood--Root weevils have been reported attacking pines at various locations in Newfoundland for several years. Early in the current season trees in 10 plantations on the Avalon, Bonavista and Burin peninsulas were examined and Hylobius warreni Wood larvae were found in all areas. The plantations examined were composed primarily of jack and Scots pine with inter-plantings of other pine species and some spruces. Trees were attacked indiscriminately regardless of species or age class, but mortality was more common among the pines. A plantation at Collier's Ridge and one at Western Bay on the Avalon Peninsula were so severely damaged by this weevil that they have no economic value. Trees in the remaining plantations were not as severely injured by the weevil. However, severe damage by wind, frost, snow and/or animal browsing was very prevalent in all areas. The sites of these plantations varied from sandy loam to stony heathland and were generally exposed and not favourable for the successful production of pine forests (Figures 10, 11, 12, 13, 14 and 15). Hylobius damage to plantations in eastern Newfoundland is summarized as follows:

Hylobius Damage to Plantations in Eastern Newfoundland

Location	Acres	No. planted	Year planted	Transect	No. trees examined		% trees		Remarks
							attacked	dead	
Western Bay "A"		300,000	1950-51	10 ch. x 8 ft.	ScP	48	100	29.2	Clay/shale; minor vegetation sparse
Collier's Ridge	60		1940-42	40 " x 4 "	jP ScP	96 215	100	jP 15.6 ScP 18.6	Clay/shale; minor vegetation sparse
Western Bay "B"		300,000	1950-51	10 " x 8 "	ScP	38	90	6.8	Stony, dense heath
Park Road	6		1937	Random	jP, ScP, rP, nS, ?S, wS		Approx. 90		Sandy loam, minor vegetation negligible
Windsor Lake	10		1948-49	5 ch. x 8 ft.	jP ScP	25 25	75	Nil	Old field; clay loam; minor vegetation negligible
Tilton Barrens		418,000	1949-50	10 " x 8 "	jP ScP	31 18	jP 6.2 ScP 11.1	"	Stony, dense heath
Salmonier Nursery	2	2,500			ScP	25			Gravel; some clay on slope; minor vegetation negligible
Fortune	15	112,000	1951	5 " x 8 "	ScP	50	2		Stony, wet clay; minor vegetation negligible

Hylobius Damage ... (Cont'd.)

Location	Acres	Number planted	Year planted	Transect	No. trees examined	% trees		Remarks
						attacked	dead	
Catalina Crossroads	22	160,000	1944-49		ScP, jP 10 yP, wP, nS, wS	4		Rocky, barren hillside; vege- tation sparse
Bonavista	25	165,000	1944-50		ScP, jP 10 wP, nS	3		Flat barren; vegetation grasses and Kalmia

Larch Casebearer, Coleoptera laricella (Hbn.)--Larch casebearer numbers were low throughout eastern Newfoundland during 1965 and browning of foliage was generally negligible. However, a slight increase in larval numbers was recorded in the central part of Terra Nova National Park and medium browning was apparent over a few acres along the Terra Nova Road. A summary of sampling data based on the number of casebearers on 30 fascicles per tree at 20-tree sampling stations follows:

Location	★ Stand vigor	Stand defoliation	No. of cases on year-old shoots (Corr.)	
			Av.	Dev. from 1964
Jack's Pond		L	0.0	-
Blaketown		"	0.0	-
George's Brook		"	0.1	0.0
Lethbridge		"	0.15	+0.05
Port Blandford	MV	"	0.0	-
Terra Nova National Park - Central	"	M	0.97	+0.97
Shoal Hbr. River	"	L	0.2	-
Thorburn Lake	"	"	0.53	-
Sandringham	"	"	0.0	-0.8
Terra Nova Lake	V	"	0.15	-
Lake Kepenkeck	"	"	0.15	+0.15
Pinsent's Ridge	"	"	0.0	-
Colinet	U	"	0.0	-0.1
Holyrood	V	"	0.0	-

★

Stand vigor: V = Vigorous
 MV = Moderately vigorous
 U = Unthrifty

Birch Leaf Miner, Fenusa pusilla (Lep.) and Birch Leaf-mining Sawfly, Heterarthrus nemoratus (Fall.)--These leaf miners were common on roadside white birch saplings along the Trans Canada Highway and many of the local roads in District 3 (Figure 16). The size and intensity of isolated outbreaks varied and browning of foliage ranged from light to severe. Light browning also was recorded on both white and yellow birch saplings in a small area near Milltown, Bay d'Espoir. A summary of leaf miner conditions in eastern Newfoundland follows:

Location	Degree of browning	Extent of outbreak along roadside
Clareville-Port Blandford (TCH)	Light (10 - 15%)	19 miles
Clareville-Bunyan's Cove	Severe (30 - 50%)	25 "
Port Blandford-Terra Nova National Park	Medium (20 - 25%)	6 "
Terra Nova National Park (TCH)	" (20 - 25%)	35 "
Terra Nova National Park to Gambo	" (25%)	18 "
Terra Nova Woods Road (Price Bros. Ltd.)	Severe (30 - 60%)	10 "
Eastport area	Light (10%)	6 "
Milltown, Bay d'Espoir	" (5%)	2 "

OTHER NOTEWORTHY INSECTS

<u>Insect species</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Average larvae per tree sample</u>	<u>No. of Collections</u>
<u>Anomogyna elimata</u> Gn. Chameleon caterpillar	bF		0.3	1
<u>Anoplonyx luteipes</u> (Gress.) Marlatt's larch sawfly		Triton Brook and Terra Nova Park areas	2.6	17
<u>Aphidae</u> Aphids	bF pCh	North East River, North West Brook, Marystown	700.0	1
<u>Caripeta divista</u> Wlk. A spruce looper	bS	Eastport	0.3	1
<u>Choristoneura fumiferana</u> (Clem.) Spruce budworm	bF	Vardville and Boat Harbour	0.3	2
<u>Chrysomela</u> sp. Willow leaf beetle	W		7.0	1
<u>Cicadellidae</u> Leaf hoppers	wB, yB Al, pCh	N.E. River, Molliers, Freshwater Pond	13.0	5
<u>Cimbex americana</u> Leach Elm sawfly	wB, W Al	Terra Nova, Sandringham, Swift Current, Triton Brk.	0.3	4
<u>Coreidae</u> Squash bugs	Al	Swift Current	1.0	1
<u>Croesus latitarsus</u> Norton Dusky birch sawfly	wB	Colinet, Marystown	3.2	2
<u>Curculionidae</u> Weevils	bF	Bell Island	0.3	1

OTHER NOTEWORTHY INSECTS (Cont'd.)

<u>Insect species</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Average larvae per tree sample</u>	<u>No of Collections</u>
<u>Diprion hercyniae</u> (Htg.) European spruce sawfly	bF	Avalon and Trinity districts	0.3	31
<u>Epimotia solandriana</u> L. A micro moth	Al, wB		6.6	4
<u>Eucordylea atrupictella</u> Dietz. A spruce needle miner	wS, bS	Burin District, Southern Bay	0.9	7
<u>Eupithecia</u> sp. A brown spruce looper	bF, bS, wS, L	Avalon, Burin, Trinity districts	0.8	23
<u>Eupithecia transcanadata</u> Mck. A looper	bF, wS	Bell Island, T.N.N.Park, Molliers	0.4	3
<u>Fenusa dohrnii</u> (Tisch.) European alder leaf miner	Al	Terra Nova, Bay d'Espoir	4.6	3
<u>Feralia jocosa</u> (Guen.) Green striped caterpillar	bF, bS, wS	Avalon, Bonavista and Trinity districts, and around Bay d'Espoir	0.5	13
<u>Griselda radicana</u> Wlshm. Micro moth	wS, bF, bS	Throughout eastern Newfoundland	0.8	14
<u>Lambdina fiscellaria fiscellaria</u> (Guen.) Hemlock looper	bF, wB	Markland, Salmonier Nursery, T.N.N. Park, Pinsent's Ridge	0.9	5
<u>Mindarus abietinus</u> Koch. Balsam twig aphid	bF	Throughout eastern Newfoundland		
<u>Miridae</u> Plant bugs	bF, wS, L, Al	Avalon, Bonavista and Trinity districts	0.8	13

OTHER NOTEWORTHY INSECTS (Cont'd.)

<u>Insect species</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Average larvae per tree sample</u>	<u>No. of Collections</u>
<u>Nematus (P.) limbatus</u> Cress. Willow sawfly	wS	Goobies and Eastport	10.2	2
<u>Nyctobia limitaria</u> Wlk. Green balsam looper	bF, wS, bS	Throughout eastern Newfoundland	1.3	23
<u>Crgyia antiqua</u> (L.) Rusty tussock moth	Al, wB	N.E. River and Pouch Cove	0.6	3
<u>Pentatomidae</u> Stink bugs	Al, wB, bS	Avalon, Bonavista and Trinity districts	0.6	5
<u>Pikonema alaskensis</u> (Roh.) Yellow-headed spruce sawfly	bS, wS	As above	0.7	11
<u>Pikonema dimmockii</u> (Cress.) Green-headed spruce sawfly	bS, wS	Throughout eastern Newfoundland	0.7	24
<u>Pontania</u> sp. A leaf-folding sawfly	tA	Terra Nova	3.2	2
<u>Pristiphora erichsonii</u> (Htg.) Larch sawfly	L			
<u>Pristiphora geniculata</u> (Htg.) Mountain ash sawfly	Mo, Haw	N.E. River (Avalon), Bell Island	19.2	3
<u>Pristiphora lena</u> Kincaid A spruce sawfly	bS	Port Blandford, Sandringham, Eastport	0.3	3
<u>Semiothisa</u> sp. A looper	bF, L	Bonavista, Burin, Fortune and Trinity districts	0.6	6
<u>Solenobia walshella</u> (Clem.) A bagworm	bF, bS	Goobies, S.W. Brook	0.4	2

OTHER NOTEWORTHY INSECTS (Cont'd.)

<u>Insect species</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Average larvae per tree sample</u>	<u>No. of collections</u>
<u>Stilpnotia salicis</u> (L.) Satin moth	bPo	Placentia	10.0	1
<u>Syngrapha selecta</u> (Wlk.) A climbing cutworm	wS	Blaketown	0.3	1
<u>Tetraphleps</u> sp. A predator	bF, bS wS, Al, L	Throughout eastern Newfoundland	1.8	10
<u>Zeiraphera</u> sp. A budmoth	wS, bF	Avalon, Burin and Trinity districts	0.9	13

DISEASE CONDITIONS

Tree disease conditions in eastern Newfoundland remained quite similar to 1964. Foliage diseases of both coniferous and deciduous trees were common but light throughout the District. Black knot of cherry and blister rust of white pine were prevalent, and leaf and twig blight of trembling aspen was common in the northern part of the District. Needle casts of larch were conspicuous for the first time since 1961 and Armillaria root rot was recorded on balsam fir near Placentia and Holyrood.

Needle Rusts on Spruce, Chrysomyxa ledicola (Pk.)
Lagerh. and C. ledi (A. and S.) de Bary--Needle rusts occurred on immature white spruce along a six-mile section of the Bauline-Pouch Cove Road on the Avalon Peninsula. Ninety % of both current and old foliage was infected.

These rusts also caused 50% discoloration of current year's foliage on black and white spruce over about five acres near Goobies. Light yellowing was recorded on white spruce regeneration near Eastport.

OTHER NOTEWORTHY DISEASES

<u>Organism</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Remarks</u>
<u>Arceuthobium pusillum</u> Pk. Eastern dwarf mistletoe	bS	Throughout eastern Newfoundland	Common
<u>Armillaria mellea</u> (Vahl ex Fr.) Kummer Armillaria root rot	bF	Holyrood and North- east River (Avalon)	"
<u>Cronartium ribicola</u> J.C. Fisher Blister rust	wP	Throughout eastern Newfoundland	Severe and common
<u>Cylindrosporium betulae</u> Davis Leaf spot	wB	Triton Brook	Moderate curling of leaves
<u>Dibotryon morbosum</u> (Schw.) Theiss. and Syd. Black knot	pC	Throughout eastern Newfoundland	Severe and common
<u>Gloeosporium apocryplum</u> Ell. & Ev. Anthracnose of maple	rM	Port Blandford	5% of foliage affected
<u>Gymnosporangium cornutum</u> Arth. ex Kern Leaf rust	Mo	Come-By-Chance River Valley	Moderate
<u>Melampsorella caryophyllacearum</u> Schroet. Needle rust	bF	Garden Cove	Light
<u>Phyllosticta minima</u> (Berk. & Curt.) Ell. & Ev. Leaf spot (purple eye)	Mo	Come-By-Chance River Valley and Port Blandford	"

OTHER NOTEWORTHY DISEASES (Cont'd.)

<u>Organism</u>	<u>Host(s)</u>	<u>Locality</u>	<u>Remarks</u>
<u>Pollaccia radiosa</u> and <u>P. elegans</u> (Lib.) Bald. and Cif. Leaf and twig blight of poplar	tA	Terra Nova area	Moderate
<u>Polyporus betulinus</u> (Bull.) Decay fungus	wB	Triton Brook	Common
<u>Taphrina robinsoniana</u> Gies. Catkin hypertrophy	Al	Southwest River and Terra Nova	"

FIGURE

8



Severe defoliation of immature balsam fir by *Neodiprion abietis* complex larvae in the Come-By-Chance River Valley. August, 1965 Photo by E. M. Haines

FIGURE

9



Immature balsam fir severely defoliated by *Neodiprion abietis* complex resulting in 10 per cent tree mortality in the Come-By-Chance River Valley. August, 1965 Photo by E. M. Haines

FIGURE

10



Resin exudate caused by *Hylobius warreni* Wood larvae feeding on the root collar of a Scots pine in the Tilton Barrens plantation. June, 1965 Photo by W. C. Parrott

FIGURE

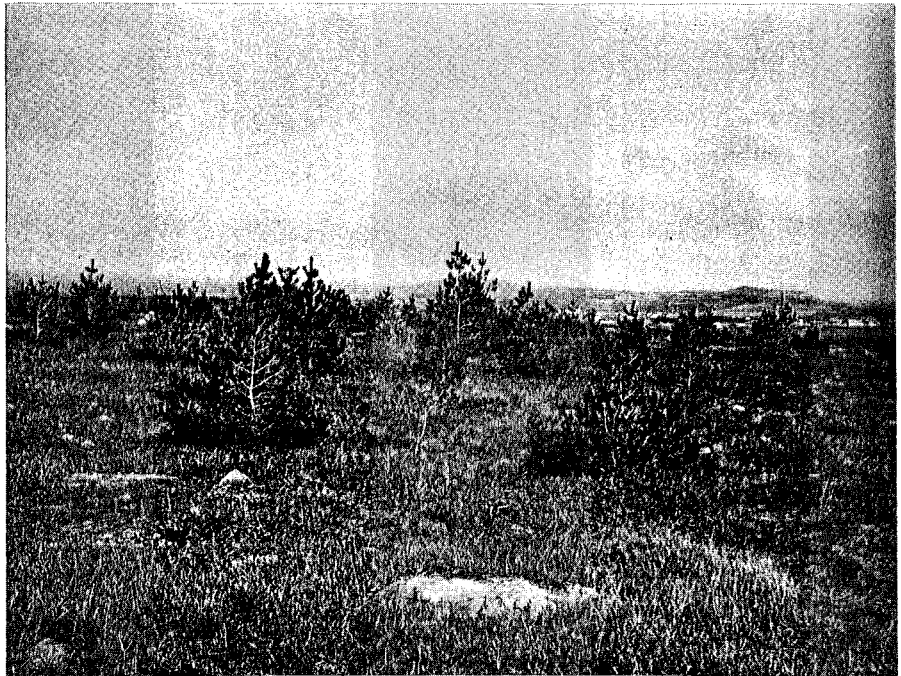
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Hylobius warreni Wood larvae in open larval tunnel at the base of a Scots pine in the Tilton Barrens plantation. June, 1965 Photo by W. C. Parrott

FIGURE

12



A Scots pine plantation planted in 1950-51 near Western Bay, Conception Bay. This site is clay/shale and minor vegetation is sparse.
Photo by W. C. Parrott

FIGURE

13



A mixed Scots and jack pine plantation planted in 1949-50 on the Tilton Barrens near Harbour Grace. The site condition is stony with dense heath.
June, 1965
Photo by W. C. Parrott

FIGURE

14



Jack pine growing on wet, rocky site in Tilton Barrens plantation near Harbour Grace.
June, 1965 Photo by W. C. Parrott

FIGURE

15

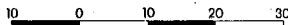


Small Scots pine growing in dense, knee-deep Kalmia on the Forestry Research plot near Bauline on the Avalon Peninsula. Note the presence of two cones on this small tree.
June, 1965 Photo by W. C. Parrott

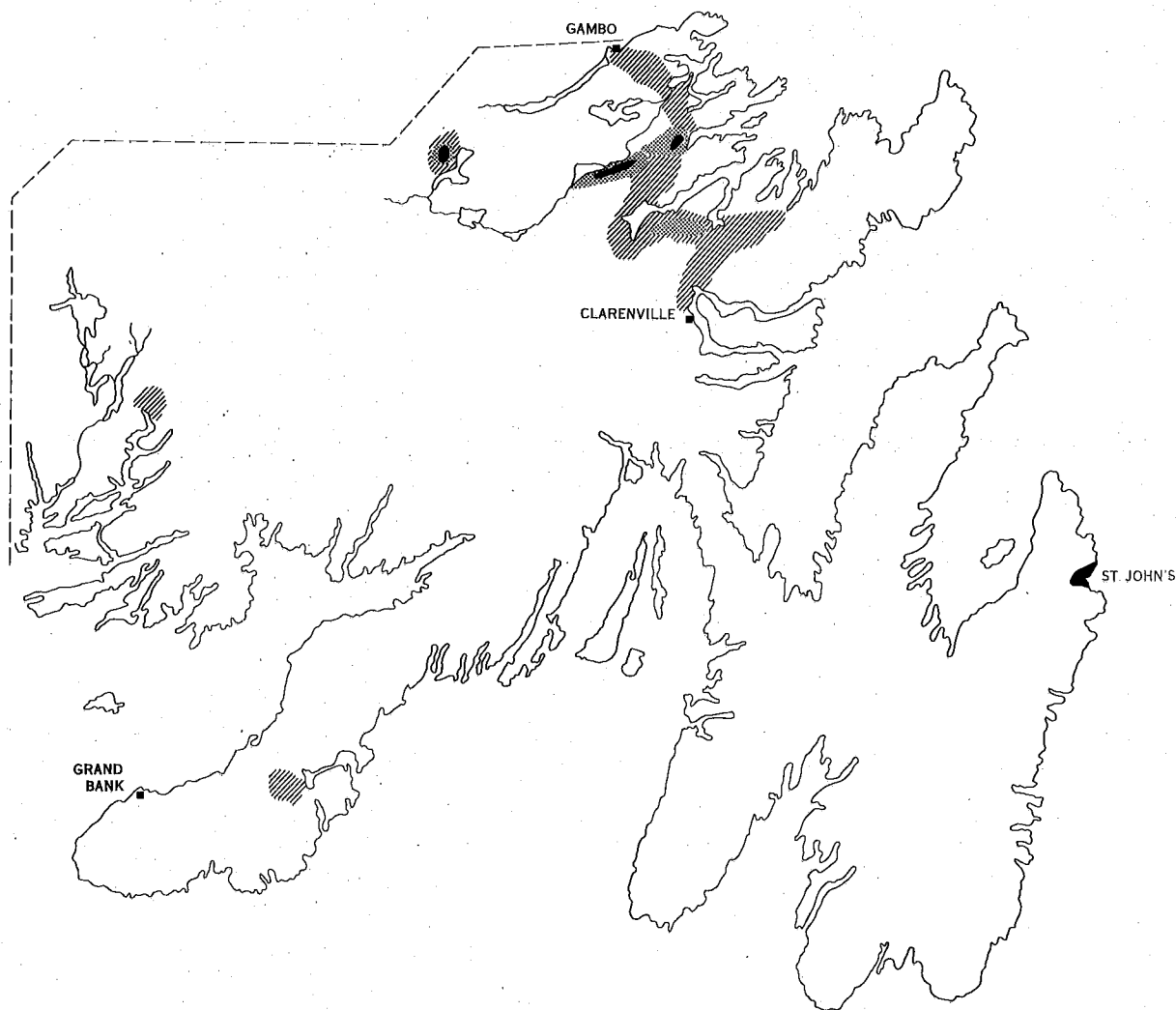
CORNER BROOK LABORATORY
FOREST INSECT AND DISEASE SURVEY
1965

Birch Leaf Miner and Birch
Leaf-mining Sawfly Defoliation

Light Medium Severe



RANGER DISTRICT 3 EASTERN NFLD



FIGURE

SECTION IV
SPECIAL SURVEY
BALSAM WOOLLY APHID
(Adelges piceae (Ratz.))

W.C. Parrott

INTRODUCTION

The balsam woolly aphid survey included both ground and aerial observations in all balsam fir areas and was conducted as described in the 1962 Annual District Report of the Forest Insect and Disease Survey, Newfoundland. The purpose of the survey was to locate balsam woolly aphid infestations and define their boundaries as precisely as possible, and where feasible to record information on infested areas, stand composition and age, kind of symptoms and extent of injury. Selected trees in damage study plots were classified by injury symptoms to maintain a comprehensive annual history of stand deterioration. District research technicians carried out preliminary investigations of each new aphid outbreak and mapped boundary changes of established infestations in their respective districts during the general forest insect and disease survey period from mid-June to late August. They also made aerial detection and mapping flights over their districts, in fixed-winged aircraft, after the collecting program terminated. Helicopters were used for intensive surveys to check selected stands which were considered highly susceptible to attack by the aphid and to map and assess the expanding boundaries of known infestations even when injury symptoms were in the initial stages. Landings were made where ground checks were necessary. The helicopter also was used on a detailed survey of balsam fir stands in Terra Nova National Park and to carry out intensive aerial damage appraisal cruises in 50-acre plots in five of the major watersheds in southwestern Newfoundland where known aphid infestations have persisted for the past 15 to 20 years.

The balsam woolly aphid continued to be the major forest pest and significant changes in its distribution were recorded. The boundaries of the main infestation in western Newfoundland were extended north in the Bonne Bay area and east along the Trans Canada Highway between Deer Lake and Hampden Road to within eight miles of the north end of Sandy Lake. Injury symptoms were more pronounced near Bonne Bay, along the southeast shore of Grand Lake and in the Lower Humber River watershed around Deer Lake. In central Newfoundland four new spot outbreaks were discovered near

Gander Lake, southwest of Badger, and on Siviér and Thwart islands in the Bay of Exploits. Minor infestation boundary changes were recorded in the Bay of Exploits and Norris Arm areas. The status of aphid infestations in the Red Indian Lake and Lloyds River watersheds changed only slightly. In eastern Newfoundland a new spot outbreak was found near Placentia and injury symptoms were more prominent around the established infestations at Bellevue Beach, Swift Current and in the area between Marystown and Boat Harbour on the Burin Peninsula. Light injury symptoms were recorded on a few balsam fir trees just east of the 1964 infestation boundary in Terra Nova National Park (Figure 17).

Eastern Newfoundland

A new balsam woolly aphid infestation was discovered between Northeast River and Placentia on the Avalon Peninsula and damage was more prominent around the perimeter of the old infestations at Bellevue Beach, near Swift Current and between Boat Harbour and Marystown on the Burin Peninsula. In Terra Nova National Park a few recently infested trees were found up to 2.5 miles east of the area in which a control-cutting operation was undertaken in 1964.

Avalon Peninsula - Aphid-infested trees were reported for the first time in the Placentia area in 1965. Light to moderate "gout" and a trace of "stem attack" were present on several immature balsam fir along the north shore of Northeast Arm from Jersey side to the mouth of Northeast River Brook where "gout" symptoms were more pronounced and extended up the river valley for about 0.5 miles. Stand composition in the general area was balsam fir, 60%; black spruce, 25%; white spruce, 10% and hardwood species, 5%. The majority of stands along the coast and to a lesser degree in the river valley have been cut over many times in the past by residents of the area for fuel, fencing and sawlogs. Consequently, reproduction and pole-size trees predominate.

Several scattered mature balsam fir with the initial stages of "gout" were located along the coastal section of Southeast Placentia, a distance of approximately 2 miles.

"Gout" symptoms were recorded as more severe on immature balsam fir at Bellevue Beach. However, the boundary of the infestations remained unchanged.

There was no noticeable change in the status of aphid conditions near St. John's.

Burin Peninsula - The boundaries of the infestations on the Burin Peninsula changed only slightly although "gout" symptoms were more prevalent on immature balsam fir along the highway from Boat Harbour to Marystown. Both "gout" and "stem attack" were more prominent around the perimeter of the old infestation near Swift Current.

Terra Nova National Park - An intensive ground, boat and aerial survey to detect initial balsam woolly aphid injury symptoms and the presence of low aphid populations even before injury symptoms are apparent was carried out in aphid-susceptible stands throughout the Park.

Aphid-infested trees were observed both within and outside the area marked for "control cut" in 1964. Only a few "gouty" trees were found in close proximity to the east and west boundaries of the "control area." However, several trees with the initial stages of "gout" were found for a distance of 2 miles along both sides of the Trans Canada Highway east to Cobblers Brook. Branch samples taken from an additional 33 trees in the Clode Sound area confirmed the presence of very light aphid populations as far east as Dunphy's Pond Road. This was about 2.5 miles east of the area marked for "control cut" in 1964. No aphids were found east of this point or on the south side of Clode Sound and only immature forms were found between Cobblers Brook and Dunphy's Pond Road, indicating that the aphid probably spread less than one mile east from observed "gouty" trees during the current season.

The Survey will continue annual surveillance of balsam fir stands throughout the Park with emphasis on intensive branch sampling in stands considered susceptible and vulnerable to aphid infestation.

It was recommended to Park officials that cutting in the original control area be completed and control measures be continued east to Dunphy's Pond Road. This would delay serious damage to stands along the Trans Canada Highway and quite possibly reduce the need of future "large scale cutting" to preserve the esthetic value of the area.

Central Newfoundland

New spot outbreaks were discovered east of King's Point along the north shore of Gander Lake, 11 miles southwest of Badger along the Badger-Buchans Road, and on Sivier and Thwart islands in the Bay of Exploits. Minor infestation boundary changes were

recorded near Point of Bay, Bay of Exploits and just south of Eel Lake, Norris Arm. There was little change in the status of aphid infestations in the Red Indian Lake and Lloyds River watersheds.

Gander Lake - Aphid injury symptoms were discovered along the north shore of Gander Lake opposite Hunt's Cove, 3 miles east of King's Point and 11 miles west of Gander. The site of the infested stand was burned over before the turn of the century and stand composition was mainly black spruce and white birch with small islands of balsam fir trees. About 20 open-grown balsam fir trees were infested in one group and scattered infested trees extended over about 2 square miles.

Bay of Exploits - Infested trees were found for the first time on the south side of Sivier and Thwart islands. However, only a few trees in the initial stages of attack were located on each island. Stand composition on Sivier Island, 3 miles north of the St. Michael's Harbour infestation, was 50% immature balsam fir and 50% immature black spruce. Thwart Island, about 1 mile north of the Brown's Arm infestation, is covered with uneven aged balsam fir-black spruce forest. Stand composition was 65% balsam fir and 30% black spruce. A severe hemlock looper infestation killed 60 to 70% of the mature balsam fir over about 5 square miles of this Island in 1948 and 1949. The infestation north of St. Michael's Harbour has spread about 1 mile north of the settlement in an immature balsam fir stand.

A few infested trees were spotted near Embree 5 miles northwest of Lewisporte where the general composition of scrub stands was about 60% balsam fir, 20% black spruce, 20% white birch and other hardwood species.

Light "gout" symptoms occurred on about 12 immature balsam fir between Phillip's Head and Point of Bay along the west shore of the Bay of Exploits. Stand composition was about the same as for the Embree area. Stands along most coastal sections of Bay of Exploits have been repeatedly logged for generations and as a result remain in an unmerchantable condition.

Scattered infested trees were found in an uneven aged stand of predominately balsam fir just south of Eel Lake, Norris Arm. This is the same area where a salvage-control burning operation was initiated by Price (Nfld.) Pulp & Paper Ltd. in 1962 and 1963.

The small infestation 11 miles west of Badger along the Badger-Buchans road was mapped from the helicopter. Eight trees

with light "gout" symptoms were found over an area of about 3 acres. The infested stand was 80% balsam fir and is being cut for pulpwood.

There was very little change in the status of balsam woolly aphid infestations in Red Indian Lake and Lloyds River watersheds. However, a few recently infested trees were recorded around the old infested area near the mouth of Tulk's Brook where a salvage-control operation was carried out in 1963. Aphid injury symptoms were more prevalent along the north shore of Red Indian Lake from the mouth of Star River to 1 mile east of Quaker's Hat. Pockets of trees in these stands showed severe damage. There was no obvious change in the status of the infestation that extended for 9 miles along the shoreline east of the Shanadithit River where only initial symptoms of aphid damage were observed on scattered infested trees.

Western Newfoundland

The boundaries of the main aphid infestation in western Newfoundland changed considerably from 1964.

Bonne Bay Area - The infestation at Southeast Arm, Bonne Bay, extends an additional 8 miles west along the north shore of East Arm to within 3 miles of the mouth of Deer Arm Brook. This area is covered with windswept balsam fir and black spruce and was severely infested with the hemlock looper in 1949-50. Many old looper-killed trees were noted throughout the area during the aerial survey. Elsewhere throughout the Bonne Bay area aphid injury symptoms were more pronounced than in 1964.

Grand Lake Watershed - Aphid injury was very apparent along the southeast shore of Grand Lake from the southwest end of the Lake to the northeast end of Glover Island. Patches of brown and red foliage were common on all age classes of balsam fir, indicating "stem attack".

Sandy Lake Watershed - A few immature balsam fir trees with initial symptoms of "gout" injury were found along the Trans Canada Highway 4 miles east of Junction Brook, and just east of Crooked Feeder Brook 21.5 miles east of Deer Lake. This confirms the spread of the aphid to within 8 miles of the Hampden Road at the north end of Sandy Lake. Eighty % of the area which was logged over during the past 20 years is black spruce bog with small islands of balsam fir-trembling aspen.

Humber River Watershed - Many dead and severely infested immature balsam fir were observed along the south side of Deer Lake

from the South Brook Valley east to the Grand Lake Canal. Mortality was most pronounced between Deer Lake and the height of land between Deer and Grand lakes. The boundary of the infestation along the north side of Deer Lake has reached the height of land near Old Man's Pond due north of Deer Lake boom, extending northeast across Goose Arm Road to the southeast end of North Lake.

Damage in 9 balsam woolly aphid mortality plots was reassessed and recorded in November. Data collected from these plots are summarized as follows:

A Summary of Tallies Recorded in Balsam Woolly Aphid Plots for
1964 and 1965

Location	Year	U	L	M	S	D	C
South Branch	1964	-	46	28	13	2	11
" "	1965	-	55	17	15	2	11
North Branch	1964	8	69	16	7	-	-
" "	1965	8	63	16	12	-	1
Highlands	1964	-	26	18	50	3	3
" "	1965	-	23	25	45	4	3
Crabbes River	1964	-	17	18	63	2	-
" "	1965	-	37	23	38	2	-
Flat Bay Brook	1964	-	19	16	46	13	6
" " "	1965	-	17	21	42	10	10
Trout River (Black Duck)	1964	35	64	-	-	1	-
" " " "	1965	11	83	5	-	1	-
Wild Cove (Humber)	1964	-	6	29	41	15	9
" " "	1965	-	6	17	51	11	15
Steady Brook	1964	-	-	18	70	5	7
" "	1965	-	2	6	79	6	7
Jct. Lomond-Cormack roads	1964	60	40	-	-	-	-
" " " "	1965	30	70	-	-	-	-

U = Uninfested; L = Light; M = Medium; S = Severe; D = Dead; C = Cut

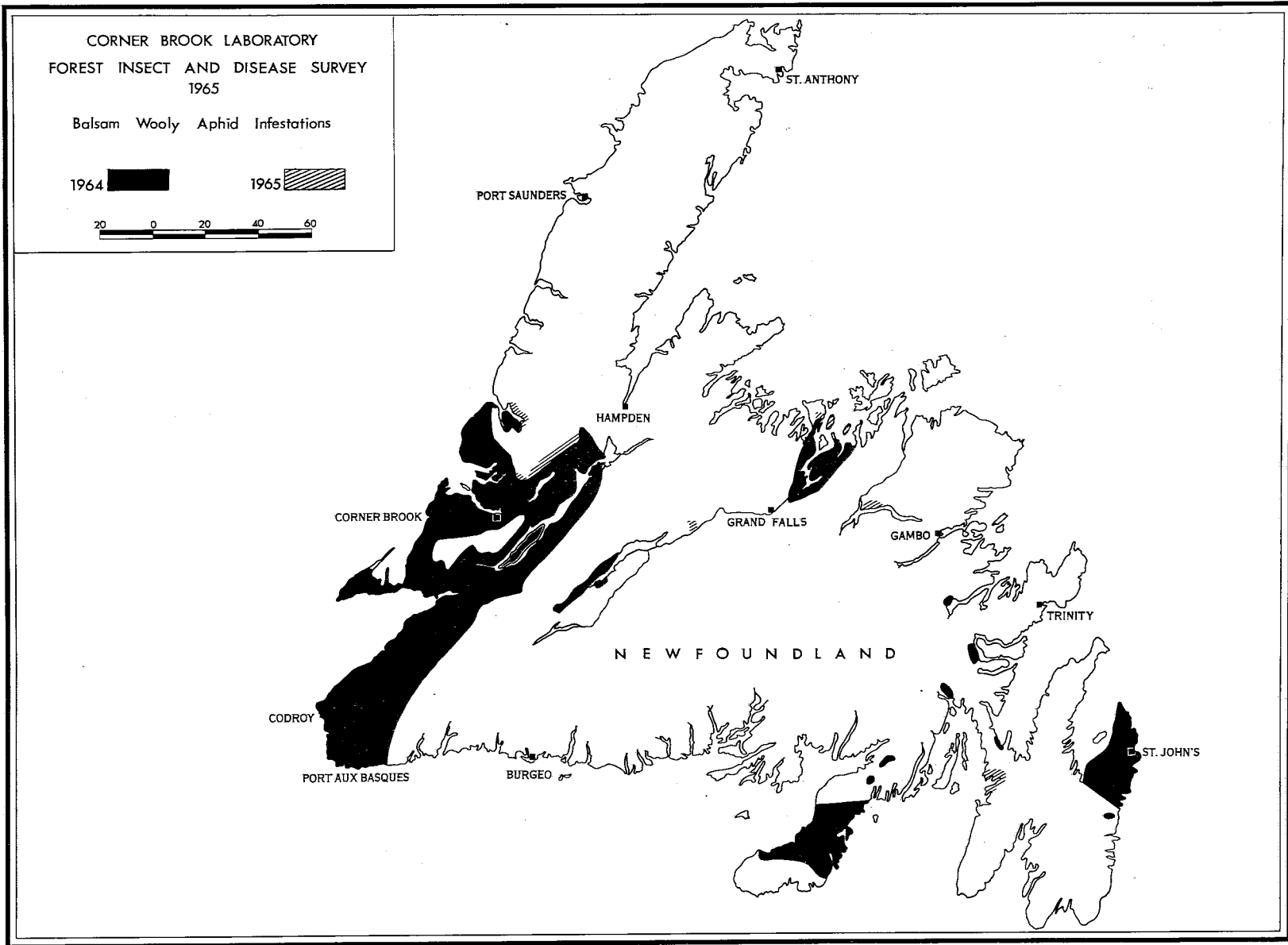
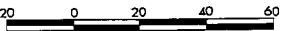
Intensive damage appraisal investigations were initiated early in 1965 in five of the watersheds in southwest Newfoundland where known aphid infestations have persisted for the past 15 to 20 years. The purpose of these investigations was to determine the rate and extent of balsam fir mortality and to improve the method of estimating aphid injury in balsam fir stands in Newfoundland. One gridded area of 50 acres each was outlined in the Bottom Brook, Little Barachois Brook, Flat Bay Brook, Fishels River and Crabbes River watersheds. A random cruise was run through each plot prior to an intensive aerial survey which was conducted in September. Data obtained from these trials will be used to establish damage class limits and to determine the variance in damage estimates obtained between ground and aerial surveys. It is hoped that intensive aerial surveys, supported by minimum ground cruises, will provide comprehensive damage appraisal information suitable for reporting and predicting stand deterioration. The results of these surveys may also provide information for recommending control measures and a history of outbreaks for use by other research disciplines. A description of a new method for assessing aphid injury symptoms, with the appropriate recording forms, and the results of the preliminary study on comparisons of ground and aerial line cruises will appear in a separate report when data have been analyzed and interpreted.

CORNER BROOK LABORATORY
FOREST INSECT AND DISEASE SURVEY
1965

Balsam Woolly Aphid Infestations

1964  1965 

20 0 20 40 60



FIGURE

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