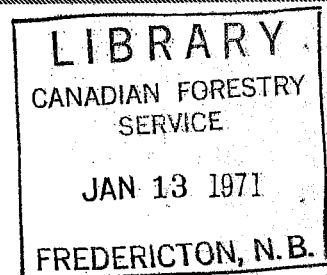


**ANNUAL DISTRICT REPORT
FOREST INSECT AND DISEASE SURVEY
NEWFOUNDLAND
1969**



by
L.J. Clarke, E.C. Banfield, W.J. Sutton,
D.M. Stone and D.S. O'Brien

**FOREST RESEARCH LABORATORY
ST. JOHN'S, NEWFOUNDLAND
INFORMATION REPORT N-X-53**

**CANADIAN FORESTRY SERVICE
DEPARTMENT OF FISHERIES AND FORESTRY
NOVEMBER, 1970**

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FORWARD

Traditionally, the text of the Annual District Survey Reports has been arranged by Survey District. However, recent experience has shown that such an arrangement does not lend itself to the efficient extraction of information. Therefore, this issue of the District Report is assembled according to insect and disease species. The more important species are discussed in some detail and the less important or incidental species are listed in tabular form as in previous years. The breakdown of the Island into Survey Districts is shown in Figure 1.

In addition to general insect and disease surveys, personnel were responsible for monitoring hemlock looper population levels for an extensive aerial spray operation, assessing the impact of the spray, estimating damage to stands and predicting conditions for 1970. Other duties included a continuation of studies on the rate of deterioration of fir damaged or killed by the looper, and a continuation of the cull survey being conducted in conjunction with the Newfoundland Forest Inventory Section.

Staff changes during the season included the employment of Miss M. Taylor as an insectary technician, to replace Mrs. S. White who resigned. Four students from the College of Trades and Technology were employed during the summer to assist in the hemlock looper sampling program and Dr. I.S. Otvos, a newly appointed Research Scientist, was assigned to the Survey to study factors influencing fluctuation in population levels of the hemlock looper.

DISTRICT MAP
NEWFOUNDLAND REGION
FOREST INSECT AND DISEASE SURVEY

- 101 AVALON
- 102 BURIN
- 103 BONAVISTA
- 104 GANDER
- 105 HERMITAGE
- 106 GRAND FALLS
- 107 ST. GEORGES
- 108 HUMBER
- 109 WHITE BAY
- 110 ST. BARBE

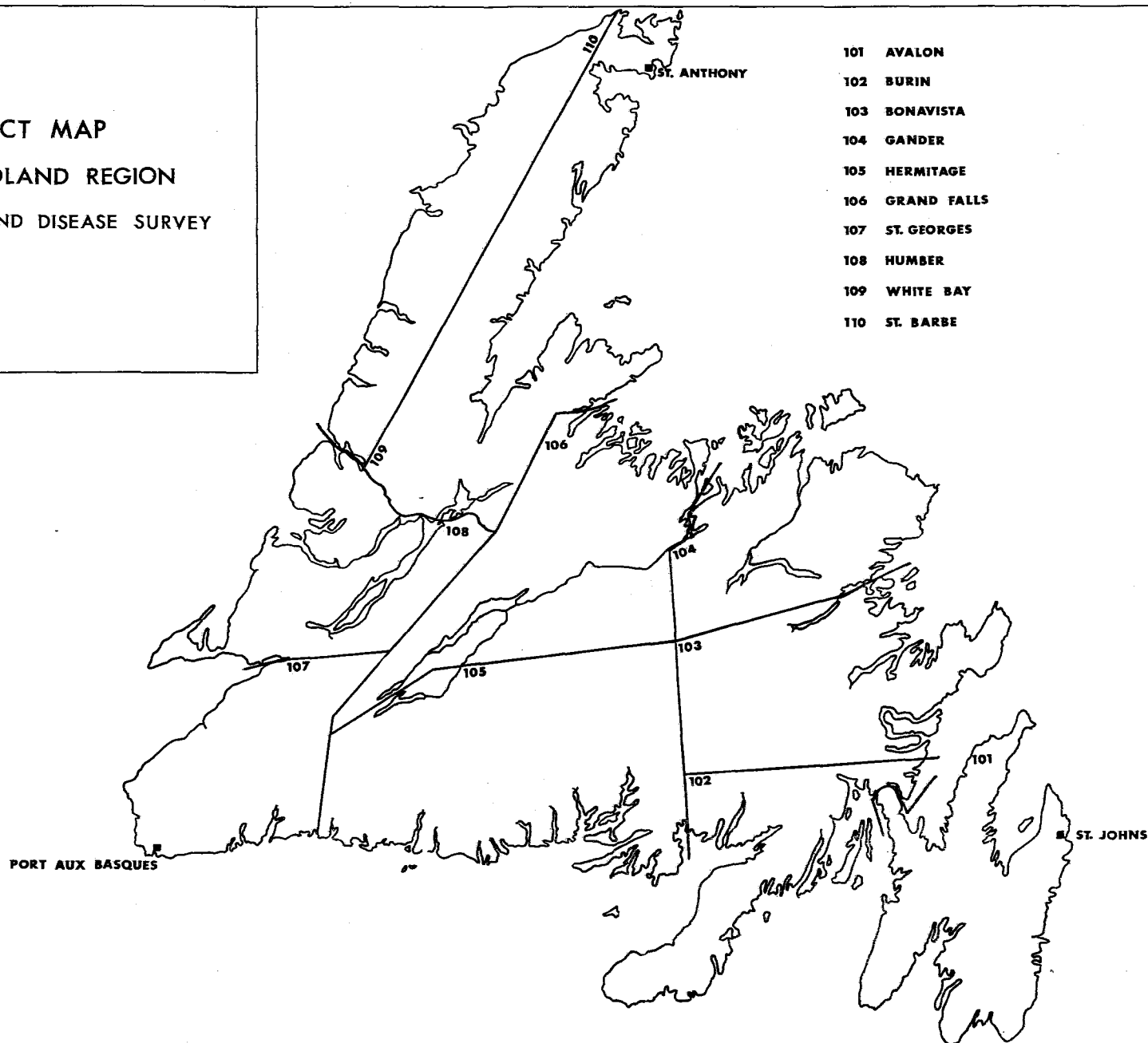


FIG. 1

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INTRODUCTION

The major effort of the Forest Insect and Disease Survey was again concerned with monitoring hemlock looper population levels for a chemical control operation, assessing the effect of this operation, estimating damage caused by the looper and forecasting looper conditions for 1970. A total of 1,120 insect and 43 disease samples was collected, 917 of which were from balsam fir as part of the looper monitoring program.

The hemlock looper continued to defoliate extensive stands of balsam fir in all but eastern stands on the Island. However, results of aerial and ground surveys, conducted after chemical treatment of more than 2,000,000 acres of infested forest, indicated that the outbreak was weakening and that damage was less serious than in 1968.

Armillaria root rot continued to be the most important tree disease with serious damage recorded in plantations of exotic tree species and in natural growing merchantable fir killed or severely damaged by the balsam woolly aphid and/or the hemlock looper.

IMPORTANT FOREST INSECTS

Eastern Hemlock Looper, Lambdina fiscellaria fiscellaria (Guen.) - The hemlock looper outbreak continued in 1969, causing moderate to severe defoliation of approximately 733,342 acres of balsam fir (Fig. 2). Surveys in the fall of 1968 showed that the outbreak boundaries had extended in central Newfoundland and on the Northern Peninsula indicating that insecticides should again be applied in 1969 to minimize losses of fir. Experience gained during the 1968 spray operation indicated the need for an improved program in 1969. Therefore, in December 1968 a Task Force, consisting of personnel from industry and the Province, was formed to plan, coordinate and control the 1969 operation. A member from the Newfoundland Forest Service was chairman and personnel from the Canadian Forestry Service acted as advisors on biological aspects of the problem. The Forest Insect and Disease Survey accepted responsibility for detection and appraisal surveys to determine the time of spray application, what areas required treatment, evaluation of treatment, mapping of defoliation and provided a prediction of condition for 1970.

Priorities for spraying were defined as follows:

Priority A - All defoliated stands, except those marked for salvage, and other mature and over-mature stands possessing a high balsam fir component and a high economic value.

Priority B - Mature and over-mature stands composed primarily of balsam fir but of less economic value either because of distance from mills or lower merchantable volume.

Priority C - All other stands with 25% fir, more than 30 years old, with potential merchantable value.

Distribution of the priorities is shown in Figure 3.

These priorities were compiled on a composite 1:250,000 scale master map of the Island. Boundaries of the 10 survey districts were shown on the map as were boundaries of respective 1:50,000 scale one-half topographic maps. These latter maps were numbered so that all information pertaining to the spray operation could be relayed by a numerical system.

The biological information, required to conduct the spray operation and to assess looper conditions, was collected in six stages: a larval development survey, pre-spray larval survey, post-spray larval survey, aerial reconnaissance survey, post-spray aerial assessment survey and moth survey.

The larval development survey began on June 2 and was conducted by three road crews operating from vehicles. Sampling stations were established in areas where looper outbreaks had been active in 1968. At each station up to six trees were sampled in pairs every 2 or 3 days or until 10 or more larvae were recorded. This latter number was arbitrarily chosen to indicate when pre-spray larval sampling should be initiated and as an indication that an area required protection. Pre-spray sampling was conducted by using a 7 foot by 9 foot beating sheet on which nine equal rectangles were drawn. Two trees were sampled on one side only and numbered T1 and T2 on the sampled side. The sampled side of each tree was identified with marking tape which was also attached in a conspicuous manner to a tree at the edge of the stand, to facilitate easy location of the site on return trips. Areas were sampled again if no looper or low counts were obtained during the first 10 days of sampling. Survey enclosure slips were completed for each pair (T1 and T2). When larvae were numerous, (100 or more) numbers were estimated by counting the number of larvae on the central square of the beating sheet and multiplying by nine. Each pair of trees represented one sample and looper numbers were expressed as an average per tree.

The first looper larva was found on June 9 at South Brook Valley in western Newfoundland and the first samples of 10 or more larvae were collected

on June 10, at Goose Arm, in western Newfoundland and on June 17, near Badger, in central Newfoundland. Pre-spray larval sampling did not begin until June 16 as helicopters were not available until that date. A total of 742 locations, selected from the priorities of landowners, was sampled. This sampling was completed by July 15. Sampling indicated that looper populations were low in stands south of Serpentine Lake, on the Baie Verte and Avalon peninsulas, and on the Northern Peninsula except for 60,000 acres near Portland Creek. Other areas ranged from moderate to high with the highest population levels occurring in the central areas from Gambo Lake to Deer Lake. Results of sampling from each location was relayed daily to spray headquarters for determining what spray blocks required treatment.

The aerial spray program began on June 28 and was completed on July 27. Twenty-one spray aircraft treated a total of 2,054,900 acres (Figure 4). Phosphamidon was used on 104,000 acres and fenitrothion on the remaining 1,950,900 acres.

On July 3, an aerial reconnaissance survey was carried out to record current defoliation of the infested areas and to adjust the spray program to include any seriously defoliated areas that had not been included in the initial spray program.

Post-spray larval sampling was conducted to determine if the spray reduced larvae numbers on sampled trees. Samples were collected at 66 locations that were previously sprayed and had high pre-spray larval counts. Sampling began on July 17 and samples were collected from each of four trees; from the opposite sides of the two trees used for the pre-spray sampling and from two additional undisturbed trees. All but three areas showed a reduction in larval numbers.

Chemical	Treatment	No. of trees sampled		No. of larvae	
		Pre-Spray	Post-Spray	Pre-Spray	Post-Spray
Fenitrothion	2 + 0 oz.	27	49	873	351
	3 + 0 oz.	2	4	27	17
	2 + 2 oz.	57	102	3037	341
	2 + 3 oz.	22	46	1373	128
*Phosphamidon	2 $\frac{1}{2}$ - 3 - 4 oz.	8	16	495	212

* Spray areas varied from 2 $\frac{1}{2}$ oz. to 4 oz.

A comparison of pre- and post-spray larval samples showed an average reduction in larval numbers of 92.8% in stands treated with fenitrothion and 78.6% in stands treated with phosphamidon.

On August 20, an aerial assessment survey was initiated to record looper damage. This was completed on August 29, except for the Bonavista and Avalon peninsulas. These areas were examined on September 14 and 15. This survey included two crews for mapping looper damage over all forested areas on the Island. Cessna 180 aircraft were used and they operated from Gander and Pasadena. Damage was mapped on 1:250,000 scale maps and was classified as light, moderate, severe or dead. The acreage of active infestation and dead stands are shown in Table I. Other insect and disease conditions were also mapped or recorded where observed.

The moth survey began on September 23 and was completed on October 6. Motor vehicles and a Cessna 180 aircraft were used to cover major forest areas. Trunks of birch trees and old tree stumps were beaten to disturb resting moths and the fluttering moths were estimated as numerous (20 or more), few (1-20) and none (0). Dead moths on the ground or in pools or puddles of water were also noted.

Personnel of the three forest limit holders were requested to provide information on moth occurrence using self explanatory sample forms supplied by the Forest Insect and Disease Survey.

TABLE I

Infestations and Dead Areas 1969

Hemlock Looper

Western Newfoundland	Acres infested	Acres dead
O'Regan's	2,864	-
Highlands	2,857	-
Highlands to Codroy Pond	5,654	-
South Brook Valley - Glover Island	16,860	-
Serpentine Lake	21,963	1,421
Fish Head	421	-
York Harbour	4,370	-
Cox's Cove to Frenchman's Cove	10,148	-
North Arm to Deadmans Pd.	19,550	-
Deer Lake	18,433	-
Deer Lake to Grand Lake	17,050	-
Grand Lake	29,859	1,871
Sheffield Lake	8,904	-
Birchy Lake	8,531	-
Adies Pond	8,717	-
Trout River - Kennedy Lake	10,966	-
Whites River	328	-
Birchy Lake	147	-
Halls Bay	3,454	-
St. Paul's Inlet to Parsons Pd.	24,102	-
Western Brk. Pond to St. Pauls	5,360	-
Parsons Pond	10,680	-
Portland Creek Pond	440	-
Total	231,658	3,292
<u>Central Newfoundland</u>		
Little River to Southeast Brook	12,151	-
Long Pond to Bay D'Espoir	2,864	-
Round Pond to Ahwachanjeesh Pond	9,559	-
Round Pond to Long Pond	13,887	-
Matthews Pond to Twillick Brook	30,502	-
Bruce Pond	14,725	-
Berry Hill Pond	10,083	-
Gull Pond to Great Burnt Lake	7,350	-
Crooked Lake	642	-
Lloyds Lake to Lloyds River	5,885	-
Lloyds Lake	985	-
Star Lake to Lloyds River	3,185	-
Red Indian Lake	15,567	-
Harbour Round Pond	1,014	-
Harpoon Hill	8,629	-
Noel Pauls Brook	5,615	-
Sandy Lake to Noel Pauls Brook	966	-

TABLE I (cont'd)

Atlantic Lake	1,289	-
Miguels Lake to Great Rattling Brook	3,822	-
N.W. Gander River to S.W. Pond	15,634	-
S.W. Gander River to Triton Brook	6,898	-
Gambo Pond to Deer Pond	11,226	-
Gambo Pond	4,454	661
Gander Lake to Rodney Pond	8,800	-
Gander Lake to Hunts Pond	3,924	-
Christmas Pond	1,269	461
Burnt Lake to Crowe Lake	3,659	-
Rushy Pond to Great Rattling Brook	3,498	-
Aspen Pond to West Lake	13,684	270
Exploits River	14,694	725
Glodes Pond to Exploits River	8,476	-
East End Red Indian Lake	711	-
Gull Pond to Joes Lake	22,794	-
North Twin Lake and Cornfield Pond	25,669	-
New Bay Pond to Bishops Falls	41,187	1,156
New Bay Pond to Rattling Lake	17,311	666
Bay of Exploits to Amy's Lake	9,771	642
Point Leamington	745	-
Lewis Lake	11,839	-
Halls Bay to South Twin Lake	9,191	-
Halls Bay and West Pond	12,480	-
Upper Burnt Berry Pond	40,626	-
Halls Bay	<u>3,454</u>	<u>-</u>
Total	440,713	4,581

Eastern Newfoundland

Hungry Grove Pond	2,622	-
Little River to Koskaecodde Lake	15,047	-
Conne River to Jubilee Lake	12,960	-
Rainy Lake to Kaegudeck Lake	14,161	-
Clode Sound	622	-
Little Gander Lake to Terra Nova River	3,185	-
Alexander Bay	1,000	-
Alexander Bay to Newman Sound	431	-
Great Content Cove	<u>1,191</u>	<u>-</u>
Total	51,219	-

Balsam Woolly Aphid, *Adelges piceae* (Ratz.) - Boundaries of known infestations remained unchanged throughout the Province except in the Bonavista Peninsula where the infestation extended north as far as Jamestown (Figures 5 & 6). This outbreak was discovered at Clarenville in 1967 and now includes approximately

58,000 acres. Stem attack was observed in the Browns Arm - Lawrencetown - Norris Arm area for the eighth consecutive year. Some 160 acres of severely damaged and dead trees were observed during aerial surveys. This area was also defoliated by the hemlock looper which doubtless increased the incidence of tree mortality in the area. Provincial authorities plan salvage operations in 1970.

A chemical control experiment, against the aphid, was conducted by the Chemical Control Research Institute this season at Black Duck in western Newfoundland. Eight insecticides were tested, formulated to contain 5% active ingredient. Results showed that Dursban caused the highest mortality shortly after application with the remaining seven showing increased mortality up to 20 days following treatment. A complete summary of the tests is shown in Internal Report C.C.-8 by W.W. Hopewell.

An attempt was also made to establish the polystrain fungi, Fusarium sp. and F. larvarum on trees infested by the aphid near Trout Brook in western Newfoundland. The disease material and instructions for application were supplied by Dr. W.A. Smirnoff of the Quebec Region. Four trees were treated with a liquid suspension of disease spores and four with a dust mixture of spores but no diseased aphids were recovered.

Balsam Fir Sawfly, Neodiprion abietis complex - Population levels of this sawfly were greatly reduced in 1969. Defoliation was light in outbreaks near Georges Lake, Barachois Park and Gallants areas (Figure 7), where defoliation was severe in 1968. Defoliated fir was reported near Roddickton in 1968. The stand was checked in 1969 and the light defoliation was attributed to balsam fir sawfly.

Birch Casebearer, Coleophora fuscedinella (Zell.) - Outbreak boundaries continued to expand in western Newfoundland. This insect now occurs throughout the west coast, west of the Long Range Mountains, from Port aux Basques to Bonne Bay.

Severe damage was observed in an estimated 116,900 acres along the Codroy Valley, Humber Valley and in the Goose Arm - Bonne Bay areas and an estimated 10,300 acres of mature birch has been killed in the Fox Island River - Romaines Brook and the Spruce Brook - Gallants areas. Stands in these areas have been severely infested for three years but the softwood has been removed for pulpwood in recent years and the resultant stand disturbance probably increased the rate and extent of mortality of residual birch. However, evidence indicates that the casebearer was the only factor contributing to mortality of many small patches of immature birch along the Hanson Highway from Stephenville Crossing to Stephenville.

In the Gull Pond - Tommy's Arm area of central Newfoundland about 500 acres were lightly infested and although recorded in the Lloyds River Valley and on the Northern Peninsula, the insect has caused little damage. Current casebearer infestations are shown in Figures 8, 9 & 10.

Larch Sawfly, *Pristiphora erichsonii* (Htg.) - Defoliation increased slightly in 1969 after population levels virtually collapsed in 1968. Curled shoots and current defoliation were observed at Junction Brook near Deer Lake in western Newfoundland and near Indian Pond, Springdale, the north and south side of Victoria Lake, near Victoria River and in the Red Indian Lake area of central Newfoundland. Defoliation was light in all areas ranging from 5% to 25%. Some top killing was noted in stands between Victoria River and Harbour Round and Star Lake and Buchans. This damage was presumably caused during the outbreak that persisted in these areas from 1959 to 1967 inclusive.

European Spruce Sawfly, *Diprion hercyniae* (Htg.) - On Random Island and Eastport in the Bonavista District up to 66 insects per tree were found, elsewhere population levels remained low averaging 6 per tree. There was no noticeable defoliation in any locations sampled but diseased larvae were common in all collections.

Rusty Tussock Moth, *Orgyia antiqua* (L.) - Population levels declined in all areas to the low recorded in 1966 (1.0 per sample) after a 2 year outbreak in 1967 and 1968. A summary of collections of rusty tussock moth over the past 4 years follows:

Year	No. of larvae collected	Mean number per collection
1966	25	1.44
1967	120	2.56
1968	261	7.65
1969	16	1.68

Striped Alder Sawfly, *Hemichroa crocea* (Fourc.) - This sawfly caused severe defoliation of alder near the Department of Public Works Nursery, Gander, for the second consecutive year. About 5% of the shrubs were killed in the second year of attack. Severe outbreaks were recorded along the Trans Canada Highway from Glovertown to the Terra Nova River and the road from Catalina to Bonavista. Defoliation of both white birch and alder ranged from 50% to 95% in both areas.

OTHER INSECTS COLLECTED

Species	Host(s)	Locality	Average per tree sample	No. of collections
<u>Accleris variana</u> (Fern.) Black-headed budworm	bF, bS	Creston North, Port Blandford Jct., Pt. Leamington	1.4	3
<u>Acronicta grisea</u> Wlk.	wB, W	Millertown, Badger	1.0	2
<u>Adelges cooleyi</u> (Gill.) Gooley spruce gall aphid	bS	Badger	200+	1
<u>Anatis guindecimpunctata</u> (Oliver)	tL, bS	7mi. N.W. of Clarenville, Badger	1.0	2
<u>Anomogyna perguiritata</u> (Morr.) Gray spruce cutworm	bF	Eastern Blue Pond, Hughes Lake	0.5	2
<u>Anoplonyx luteipes</u> (Cress.) Marlatt's larch sawfly	tL	Elliot's Cove, Eastport, 2mi. E. of Port Blandford, 6mi. N.W. OF Clarenville, 5mi. W. of Gambo Jct., 6mi. N.W. of Clarenville, 4mi. N.W. of Salt Pond.	2.5	7
<u>Brachyrhinus singularis</u> (Linn.) A weevil	bF, bS	Pouch Cove, Torbay	0.7	2
<u>Cantharis</u> sp. Soldier beetle	bF	5mi. W. of Gambo Jct., 6mi. N.W. of Clarenville	0.5	2
<u>Choristoneura fumiferana</u> (Clem.) Spruce budworm	bF	Clarenville, Grand Lake (North Hr.), Eastern Blue Pd., Island Pond, Parsons Pond	0.5	4
<u>Cimbex americana</u> Leach Giant american sawfly	bS	11mi. N.W. of Clarenville	0.3	1
<u>Clepsis persicana</u> Fitch White-triangle leaf roller	bF	Grand Lake	0.5	1

Species	Host(s)	Locality	Average per tree sample	No. of collections
<u>Corythucha pergandei</u> Heid. Alder lace bug	Al	Badger	201+	1
<u>Ctenicera resplendens aeraria</u> Rand. A click beetle	bF	Grand Lake	0.5	1
<u>Ctenicera triundulata</u> Rand. A click beetle	wS, bF	4mi. S.W. of Charlottetown Jct., Fosters Point, Shoal Hr., 5mi. W. of Gambo Jct.	1.7	4
<u>Dimorphopteryx melanognathus</u> Roh. A birch sawfly	bS, wB	Pinchgut Lake, Cottrells Cove, Millertown	1.3	3
<u>Eupithecia</u> sp. A brown spruce looper	bF, wS, bS, tL	Creston North, Badger, Fox Island River, Bonavista and Gander Districts, Johns Pond, Baine Hr. Jct., Marystown, Salt Pond	0.6	15
<u>Euura</u> sp.	W	Pt. Leamington	3.0	1
<u>Fenusa dohrnii</u> (Tischb.) European alder leaf miner	Al	Mary March Prov. Park, Norris Arm	23.8	2
<u>Feralia jocosa</u> (Guen.) Green-striped caterpillar	Al, bF	Millertown, Creston North, Serpen- tine Lake Rd., Robinson's River Rd., Georges Bk., Southwest Pond, Browns Arm, Jct. Blue Hill Rd. & TCH, 5mi. E. of Dunphy's Rd.	0.8	9
<u>Heterarthrus nemoratus</u> (Fall.) Birch leaf-mining sawfly	wB	Pilleys Island	3.3	1
<u>Hylobius piceus</u> (Deg.) A root weevil	bF	New Bay Rd., Bay D'Espoir Rd., Lost Pd., South Brook Valley, Grand Lake Rd., Gallants Rd.	0.5	6
<u>Hylobius</u> sp. Root collar weevils	bS, bF	Sunday Lake, Mint Brook	1.7	2

Species	Host(s)	Locality	Average per tree sample	No. of collections
<u>Hypagyrtis piniata</u> (Pack.) Pine looper	bF	Cornfield Lake Rd., Muddy Gullies	0.5	3
<u>Mindarus abietinus</u> Koch. Balsam twig aphid	bF	Tote Hill (Bay D'Espoir Road)	100.0	1
<u>Nadata gibbosa</u> (J.E. Smith) Green oak caterpillar	bF	West Pond, Badger, New Bay Rd.	2.0	1
<u>Nematus limbatus</u> (Cress.) Willow sawfly	W	North Branch River Rd.	1	8
<u>Nyctobia limitaria</u> (Wlk.) Green balsam looper	bF	Borney Lake, Rodney Pond, Portland, Goose Pd., South Pond, Districts 107, 108 & 110, Fox Marsh, Miguels Lake, Lloyds Lake	0.8	23
<u>Papilio glaucus</u> Linn. Tiger swallowtail	wB	South Brook	1	1
<u>Papilio glaucus canadensis</u> Linn.	Al	Millertown, Sandringham	0.5	2
<u>Parorgyia</u> sp.	wB, bF	Pauls Lake, Costigan Lake	0.7	2
<u>Parorgyia plagiata</u> (Wlk.) Pine tussock moth	bF	Weirs Pond, Southwest Pond	0.3	2
<u>Phlogophora periculosa</u> Guen.	bF	20mi. North of Steady Brook	0.3	1
<u>Pikonema alaskensis</u> (Roh.) Yellow-headed spruce sawfly	bS	Shanadithit River, Traytown Jct., Bonavista district, Creston North, Baine Hr. Jct., Marystown	0.5	9
<u>Pikonema dimmockii</u> (Cress.) Green-headed spruce sawfly	bS	Pudops Dam, Ebbugunbaeg Canal, Lake Ambrose, South Brook, Shanadithit River, North Branch, St. Georges, TNNP (East Boundary), District 103, Swift Current, Marystown, Salt Pond	0.8	22

Species	Host(s)	Locality	Average per tree sample	No. of collections
<u>Pissodes dubius</u> Rand. Balsam bark weevil	bF	Southwest Pond, 4mi. S.W. of Charlottetown Jct.	0.5	2
<u>Pissodes strobi</u> (Peck) White pine weevil	bF	Alexander Bay	0.5	1
<u>Podabrus</u> sp. A soldier beetle	wS	Swift Current	0.5	1
<u>Pristiphora lena</u> Kincaid A spruce sawfly	wS, bS	Salt Pond, Pudops Dam, Shanadithit River, Dunphy's Pond Rd., Sandringham	0.8	5
<u>Pristiphora geniculata</u> (Htg.) Mountain-ash sawfly	Mo	North Branch, Baine Hr.	31.0	2
<u>Protoboarmia porcelaria indicataria</u> Wlk. Dotted line looper	bF	Cormack, Deer Lake, Fox Island River (7mi. E. of Pt. au Mal)	0.5	3
<u>Rhagium</u> sp. Wood borer	bF	Alexander Bay	0.5	1
<u>Semiothisa</u> sp.	bF, tL, bS, Al	Districts 103, 104, 105 and 106, Clark's Pond, Creston North, 2mi. N. of Country Pond, Grand Lake, St. Georges, Flat Bay Bk., 4mi. E. of St. Teresa Stn.	0.9	33
<u>Solenobia walshella</u> Clem. A bagworm	bF, bS	Districts 103 & 104, Rattling Brook Depot, Badger, Jumpers Brook, Little Grand Lake, Portland Creek Pond	1.6	23
<u>Syneta</u> sp. A leaf beetle	bF	Upper Manuels River, Flat Rock, Cochrane Pd., 5mi. from TCH (Salmonier Line), Districts 103 & 104, West Lake	1.1	17
<u>Syngrapha alias</u> (Ottol.) Spruce climbing cutworm	bF	Grand Lake, 2mi. N. of Steady Brook, Ocean Pond	0.4	3

Species	Host(s)	Locality	Average per tree sample	No. of collections
<u>Syngrapha</u> sp.	bF	3mi. E. of Old Man's Mtn.	0.5	1
<u>Tetraphleps</u> sp.	bF, bS, wS, tL	Pudops Dam, Buchans Jct., Elliott's Cove, Sandringham, Ocean Pond, 5mi. W. of Gambo Jct. (TCH), Creston North, 6mi. N.E. of Marystown, Salt Pd., Marystown, Baine Hr.	1.5	12

IMPORTANT FOREST DISEASES

Armillaria Root Rot, *Armillaria mellea* (Vahl. ex Fr.) Kummer - The survey initiated in 1968, to determine the status of Armillaria root rot in plantations, continued in 1969. Sitka spruce was the most susceptible species with a maximum of 67% of the trees infected (see Internal Report N-13, Singh and Carew, for details).

Results of surveys also showed that Armillaria infected and killed balsam fir, black spruce and tamarack in regeneration growing on burned sites.

Results of surveys in five balsam fir stands in western Newfoundland showed that the incidence of disease increases with aphid damage. This is shown in the following table.

Aphid damage class	Number of trees	Percentage of trees infected	Percentage of roots infected
Undamaged	40	2.5	0.8
Light	50	4.0	2.0
Medium	50	20.0	7.3
Severe	50	32.0	14.3
Dead	50	88.0	69.3

Needle Cast of Balsam Fir, *Isthmiella faullii* Darker - This disease was the most severe foliar disease of balsam fir throughout the Province. Severe damage was recorded at Northern Bay Sands Provincial Park, Avalon Peninsula and near Highland River.

Needle Cast of Larch, *Hypodermella laricis* V. Fub. - Needle cast of larch was less common and less severe than in 1968. Moderate browning was observed near Red Indian Lake and Buchans in central Newfoundland, and near Fishels Brook and Middle Brook in western Newfoundland.

Needle Rust of Balsam Fir, *Pucciniastrum epilobii* Otth. - Needle rust of fir was common and severe on current and year old foliage of young trees. Infection

was recorded as light to medium at Highland River and Middle Brook, St. Georges district and near Elliotts Cove and Britannia in the Bonavista district.

Needle Rust of Black Spruce, *Chrysomyxa ledicola* Lagerh. - Although common near Port Blandford and Badger this rust was also recorded on a few white spruce near Elliotts Cove, Random Island.

Stand Deterioration Studies - This work program began at Serpentine Lake in 1967, to study the impact of sap rot in balsam fir trees killed by the hemlock looper.

Two other study plots were established at Crabbs River in western Newfoundland and along the Bay D'Espoir road in the Great Rattling Brook area. The plots at Serpentine Lake and Crabbs River had been attacked by the balsam woolly aphid prior to the looper outbreak.

Results from the study showed no appreciable changes in the volume of heart rot, but an increase of incipient sap rot. Sap rot, increased directly with the level of aphid damage. A more detailed account of these studies is contained in "Internal Report N-15 by J. Hudak, et al".

Cull Survey - The cull survey conducted in cooperation with the Newfoundland forest inventory program was completed in 1969. An internal report N-12 by G.L. Warren et al, showed results from the study conducted in the Avalon - Bonavista, Gander - Notre Dame Bay regions. The average merchantable volume lost from cull was highest in softwoods in the Gander Region (19.5%), and highest in hardwoods in the Notre Dame Bay Region (6.8%). The percentage of cull in balsam fir varied from 5% to 18.9% and in black spruce from 3.7% to 7.1%. Decay was the most important contributor to cull in stands of all species.

Frost Damage - The only damage and mortality, caused by frost this season, was observed in a plantation of young balsam fir and a few exotic Abies species at Highland River in western Newfoundland.

OTHER NOTEWORTHY DISEASES

Organism	Host(s)	Locality	Remarks
<u>Cronartium ribicola</u> J.C. Fisher White pine blister rust	wP	St. John's, Gander	Severe
<u>Dibotryon morbosum</u> (Schw.) Theiss & Syd Black knot of cherry	pCh	Districts 101, 104, 105, 106	Severe
<u>Gymnosporangium cornutum</u> Arth & Kern. Leaf rust	Mo	Badger, Point of Bay	Light
<u>Isthmiella crepidiformis</u> Darker Needle cast of black spruce	bS	Northern Bay Sands Prov. Park	Common
<u>Lophodermium filiforme</u> Darker Needle cast of spruce	bS,wS	Northern Bay Sands Prov. Park	Common
<u>Lophodermium pinastri</u> (Schrod. ex Hook) Chev. Needle cast of red pine	rP	Red pine plantation (Bauline Line)	Light

NEWFOUNDLAND
HEMLOCK LOOPER INFESTATIONS

1969

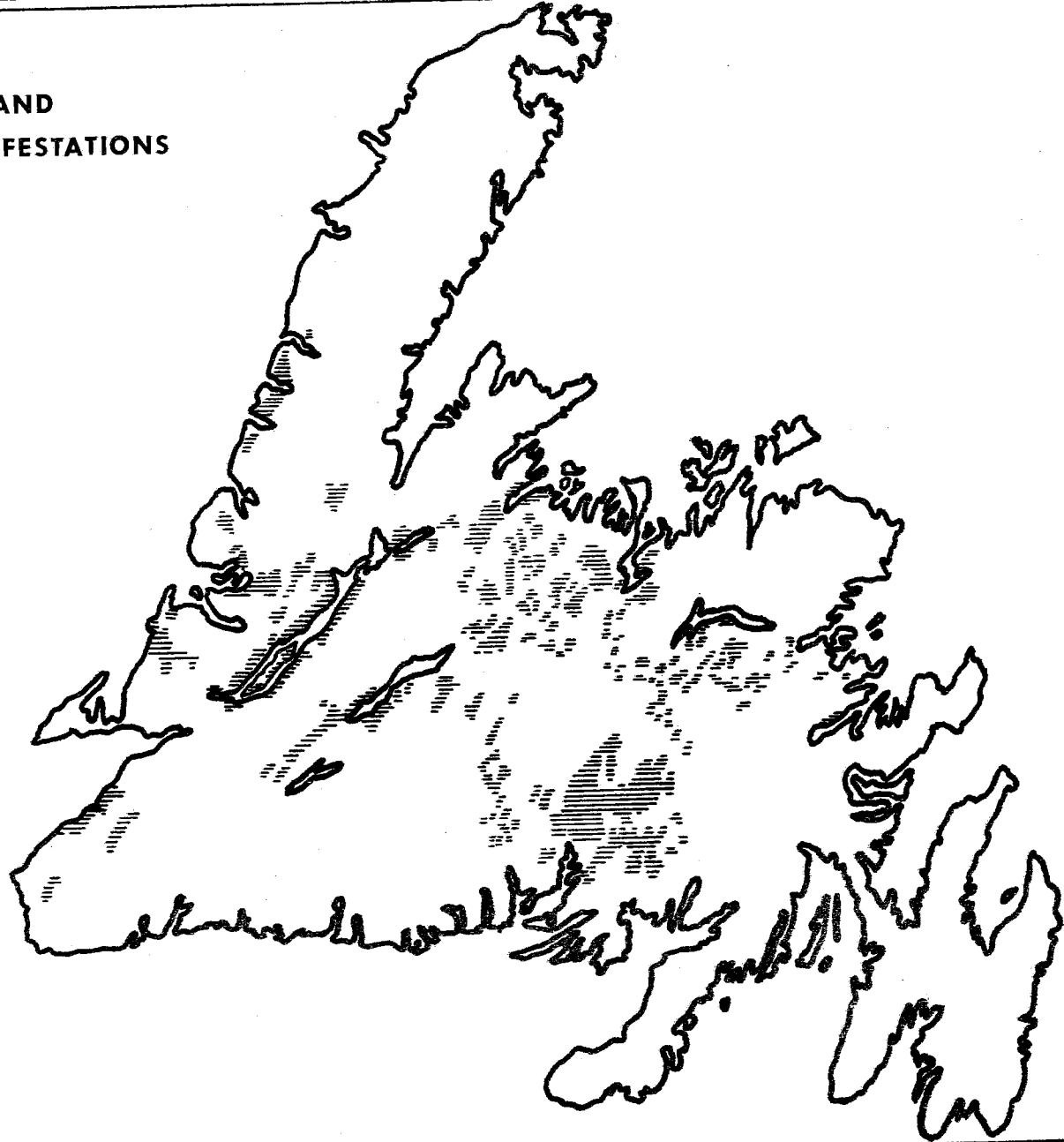


FIG. 2

EASTERN HEMLOCK LOOPER

PRIORITY SPRAY AREAS




- A ----- 
- B ----- 
- C ----- 



FIG. 3

NEWFOUNDLAND
HEMLOCK LOOPER SPRAY AREAS

1969

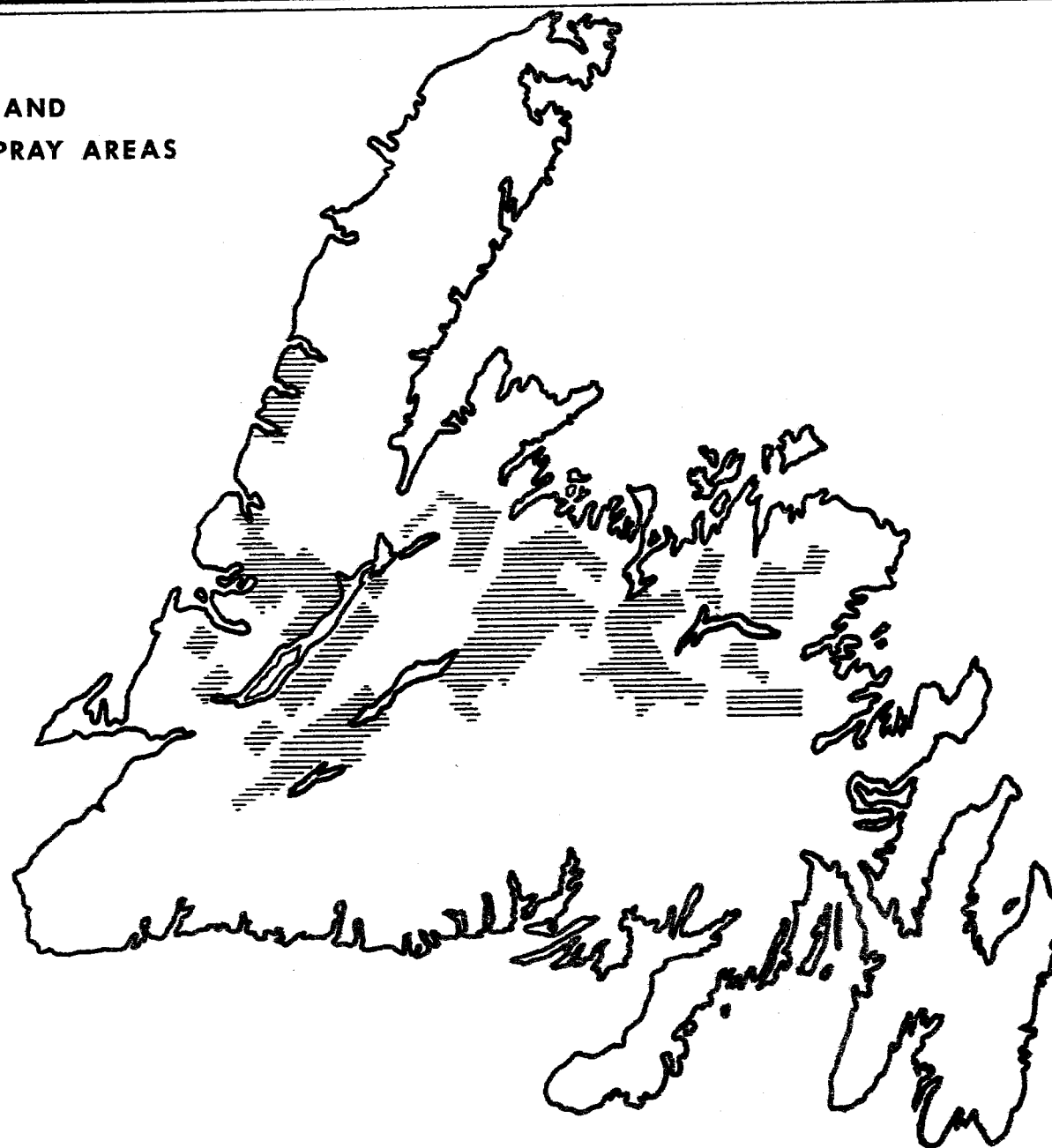


FIG. 4

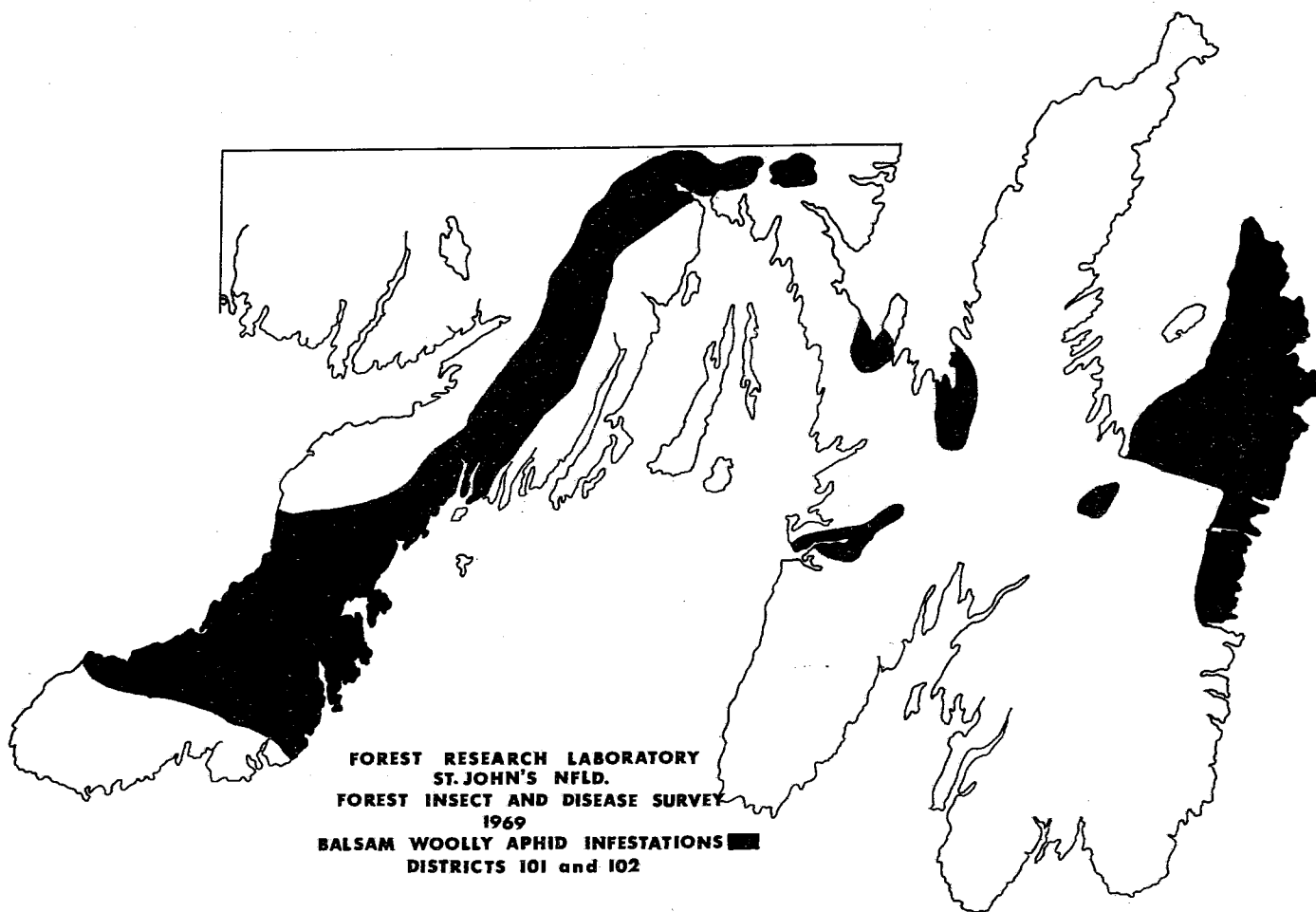


FIG. 5

**FOREST RESEARCH LABORATORY
ST. JOHN'S Nfld.
FOREST INSECT AND DISEASE SURVEY
1969
BALSAM WOOLLY APHID INFESTATIONS ■
DISTRICTS 103 and 104**

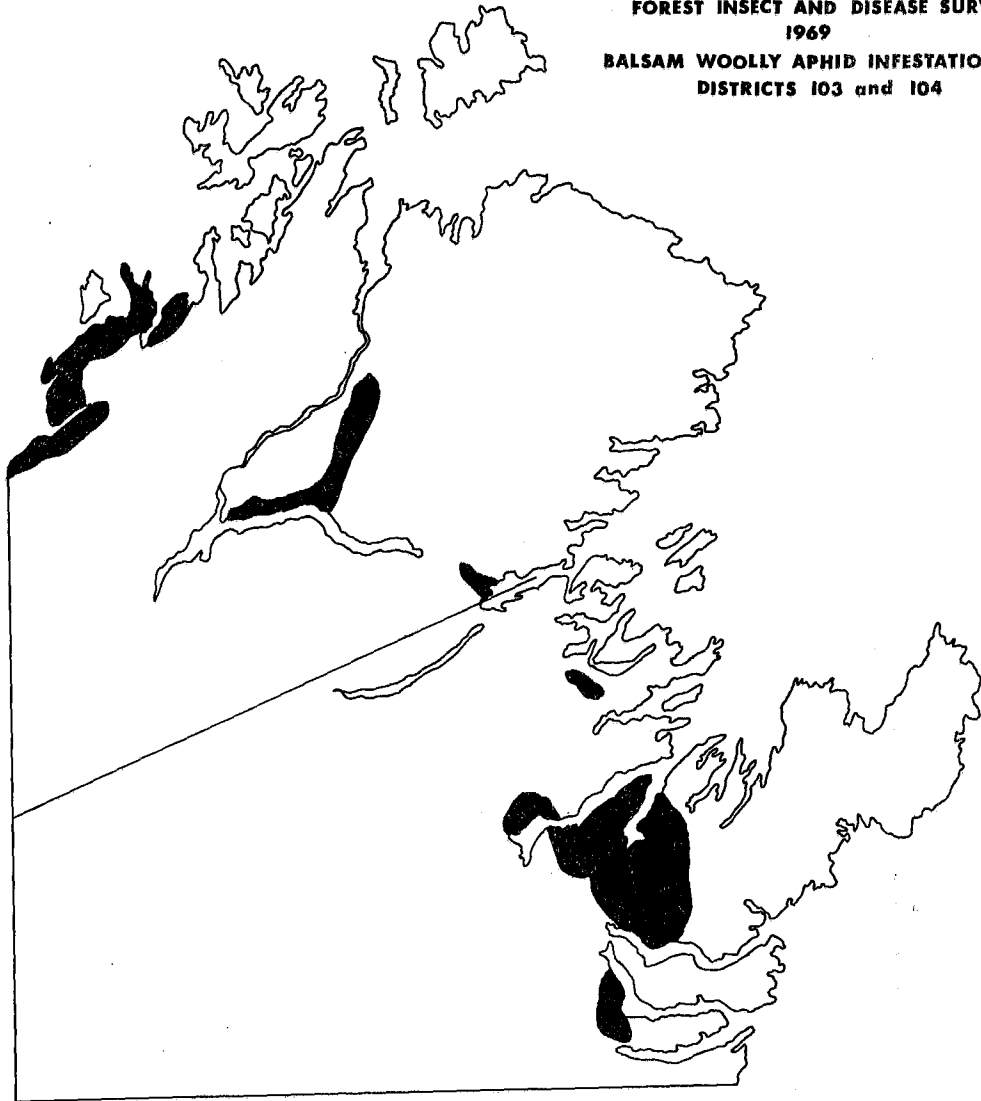


FIG. 6

**FOREST RESEARCH LABORATORY
ST. JOHN'S Nfld.
FOREST INSECT AND DISEASE SURVEY
1969
BALSAM FIR SAWFLY INFESTATIONS 
DISTRICTS 107 and 108**

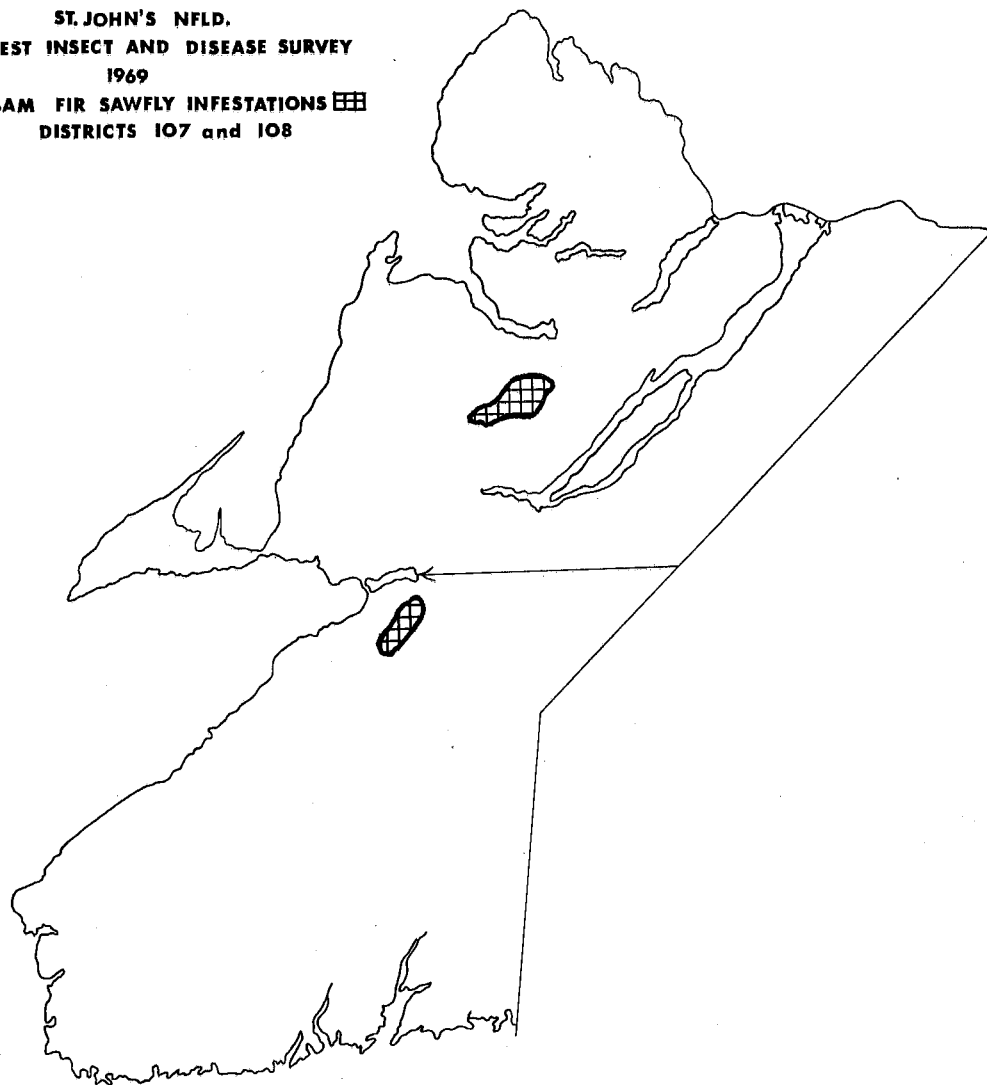


FIG. 7

FOREST RESEARCH LABORATORY
ST. JOHN'S NFLD
FOREST INSECT AND DISEASE SURVEY
1969
BIRCH CASEBEARER INFESTATIONS 
DISTRICTS 105 and 106

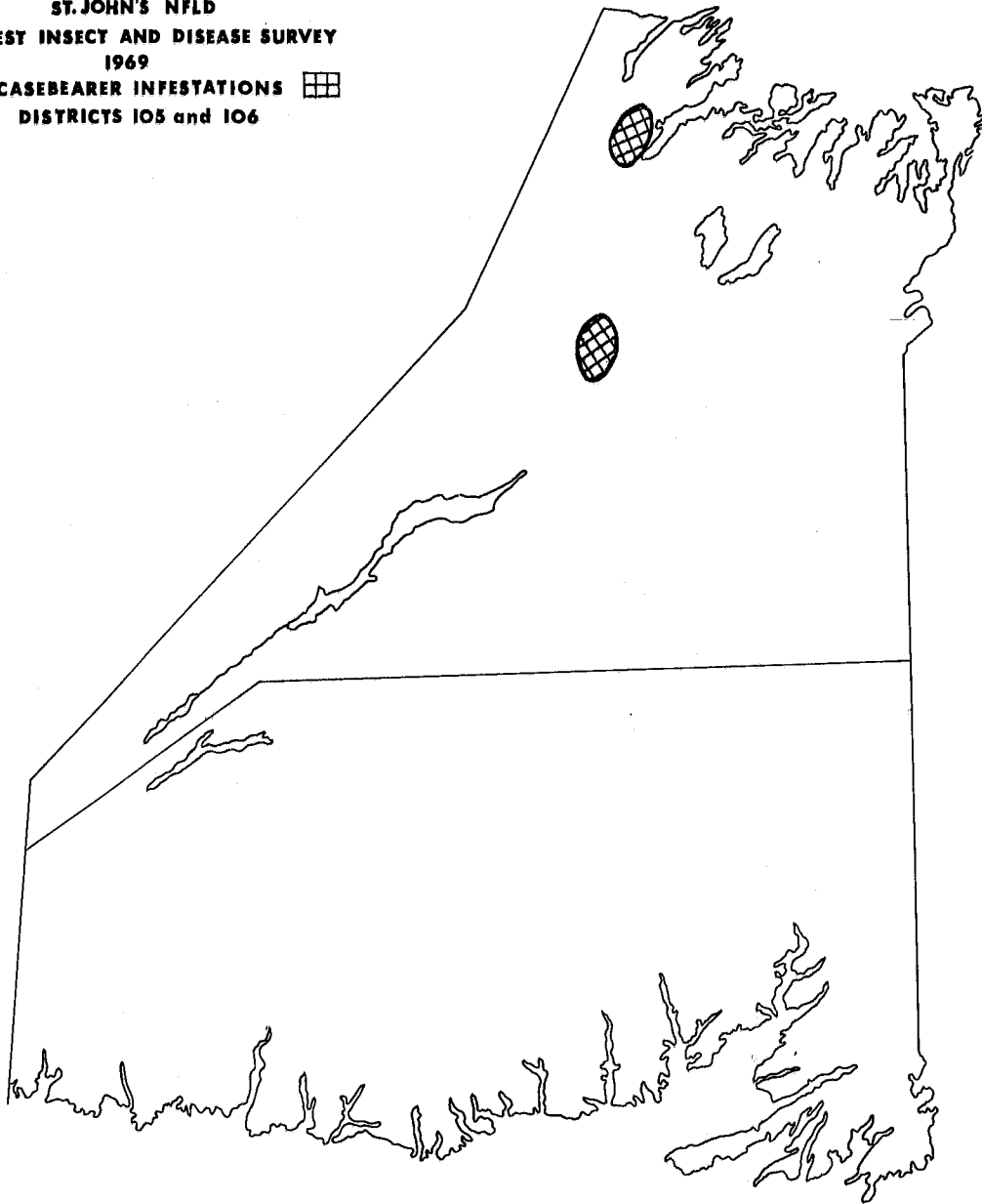





FIG. 8

FOREST RESEARCH LABORATORY
 ST. JOHN'S NFLD.
 FOREST INSECT AND DISEASE SURVEY
 1969
 BIRCH CASEBEARER INFESTATIONS
 LIGHT  SEVERE  DEAD 
 DISTRICTS 107 and 108

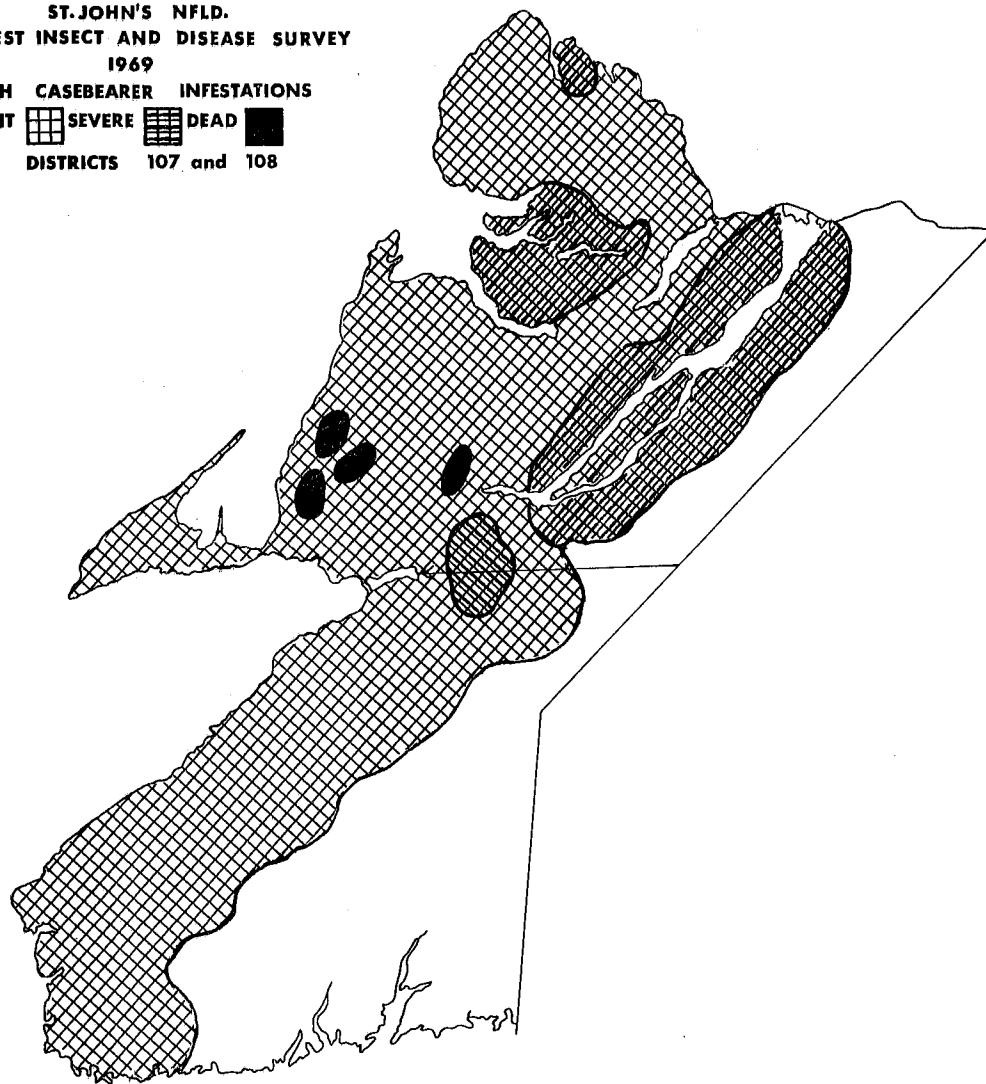


FIG. 9

**FOREST RESEARCH LABORATORY
ST. JOHN'S Nfld.
FOREST INSECT AND DISEASE SURVEY
1969
BIRCH CASEBEARER INFESTATIONS 
DISTRICTS 109 and 110**

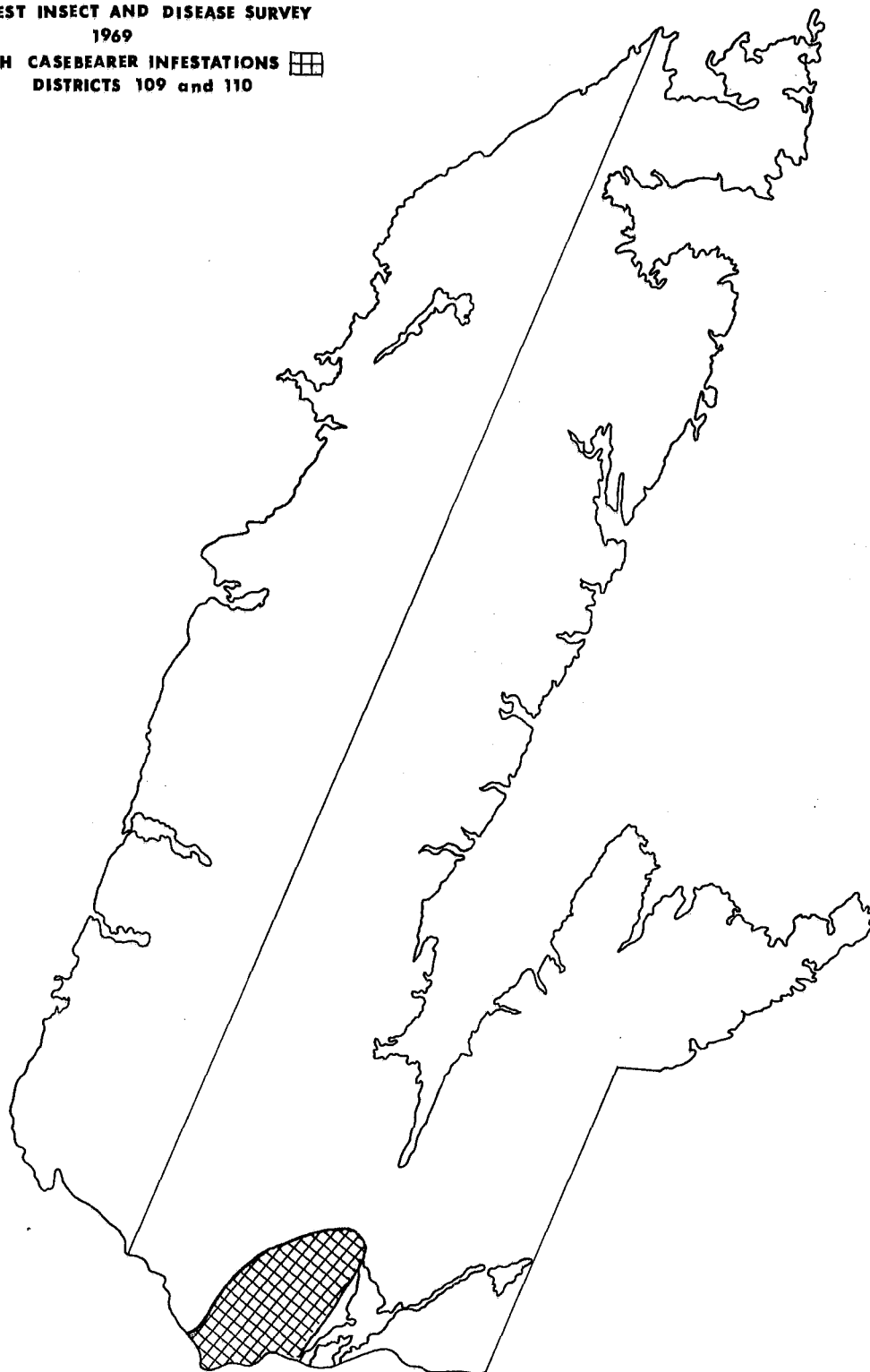


FIG. 10

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