

Environment
Canada

Environnment
Canada

Forestry
Service

Service
des forêts

1980 ANNUAL DISTRICT REPORT FOREST INSECT AND DISEASE SURVEY
NEWFOUNDLAND

by: L.J. Clarke, E.C. Banfield, W.J. Sutton, D.M. Stone,
D.S. O'Brien, K.E. Pardy and G.C. Carew.

NEWFOUNDLAND FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
INFORMATION REPORT N-X-195

MARCH 1981

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
IMPORTANT FOREST INSECTS	5
Spruce Budworm	5
Eastern Hemlock Looper	24
Spruce Coneworm	24
Balsam Woolly Aphid	26
Larch Sawfly	26
Larch Casebearer	26
Larch Bark Beetle	27
Spruce Beetle	27
Birch Casebearer	27
Satin Moth	27
OTHER NOTEWORTHY INSECTS	28
IMPORTANT FOREST DISEASES	34
Scleroderris Canker of Pines	34
Armillaria Root Rot	34
Weather Damage	35
Shoot and Leaf Blight of Trembling Aspen	35
Stem and Canker of Lombardy Poplar	35
Witches' Broom of Black Spruce	36
Broom Rusts of Conifers	36
Black Knot of Pin Cherry	36
Tip Blight of Balsam Fir	38
Taphrina Witches' Broom of Pin Cherry	38
Needle Rusts of Conifers	38
Needle Casts of Conifers	38
Leaf Spots of Hardwoods	38
Animal Damage	39
OTHER NOTEWORTHY DISEASES	40
TREE PEST EXTENSION SERVICE	41
APPENDIX I - Results of spruce budworm egg-mass and overwintering larval surveys	45

LIST OF FIGURES

	<u>Page</u>
Figure 1. Forest insect and disease survey districts	2
Figure 2. Spruce budworm defoliation 1980	7
Figure 3. Spruce budworm damage assessment 1980 districts 101 and 102	13
Figure 4. Spruce budworm damage assessment 1980 districts 103 and 104	14
Figure 5. Spruce budworm damage assessment 1980 districts 105 and 106	15
Figure 6. Spruce budworm damage assessment 1980 districts 107 and 108	16
Figure 7. Spruce budworm damage assessment 1980 districts 109 and 110	17
Figure 8. Forecast moderate and severe spruce budworm defoliation for 1981	21
Figure 9. Areas of moderate and high hazard with high populations for 1981	25
Figure 10. Areas of eastern dwarf mistletoe infection in Newfoundland in 1980	37

LIST OF TABLES

	<u>Page</u>
Table 1. Average number of spruce budworm larvae collected in ranger districts in 1979	3
Table 2. Development of spruce budworm and balsam fir in 1978, 1979 and 1980 in Newfoundland	4
Table 3. Temperatures and total precipitation for Newfoundland 1973-1980	6
Table 4. Area (ha) of defoliation caused by the spruce budworm in productive forests of Newfoundland in 1980	9
Table 5. Area and volume of productive, merchantable stands where tree mortality caused by the spruce budworm was evident in Newfoundland in 1980	11
Table 6. Area and volume of productive, merchantable stands severely damaged (D) by the spruce budworm in Newfoundland in 1980	18
Table 7. Areas of productive submerchantable stands where tree mortality was evident in 1980	20
Table 8. Summary of spruce budworm egg-mass numbers per 10 m ² of foliage for sample points with moderate and severe defoliation forecast in Newfoundland from 1978 to 1980	22
Table 9. Areas of moderate and severe defoliation and moderate to high hazard forecast in productive forests of Newfoundland for 1981	23

ABSTRACT

This report gives a detailed account of the major forest insects and diseases of Newfoundland and Labrador in 1980 and tabulates the other noteworthy pests of the region.

RÉSUMÉ

Ce rapport donne un exposé détaillé des principaux insectes et maladies des forêts de Terre-Neuve et du Labrador en 1980. Il liste les autres agents nuisibles qui sont importants pour la région.

1980 ANNUAL DISTRICT REPORT FOREST INSECT AND DISEASE SURVEY
NEWFOUNDLAND

by

L.J. Clarke, E.C. Banfield, W.J. Sutton, D.M. Stone, D.S. O'Brien,
K.E. Pardy and G.C. Carew

INTRODUCTION

This report documents the most important forest pests of the Island and Labrador in detail and the less important in tabular form. Collections totalled 507 insect and 195 disease from twelve ranger districts (Fig. 1) and 75 from visits and phone calls to property owners in the urban centres. Rangers monitored larval populations of the spruce budworm (Table 1), assessed tree damage, and sampled to forecast the extent of budworm defoliation for 1981.

Insect light traps were established at Badger, Pasadena and Goose Bay to collect new and add replacement specimens to the insect museum. These traps were monitored daily by high school students hired under the Youth Summer Work Program. Insect adults were mounted in the field for use at the Newfoundland Forest Research Centre. Several hundred specimens were collected during the summer, many of the same species but approximately 60 were a first record for the Province. It is planned to continue this program in 1981.

The cooperation of the Provincial Department of Forest Resources and Lands in providing technicians, aircraft time and inventory figures for the spruce budworm assessment, the forestry industry for providing inventory figures and the National Parks for providing spruce budworm samples was greatly appreciated.

Permanent sample plots of insect damage were remeasured for tree height and diameter and phenology plots in western and central Newfoundland were checked weekly to monitor spruce budworm development and measured for shoot elongation (Table 2). Shrew populations were monitored in late October by pitfall trapping in areas of the larch sawfly outbreak.

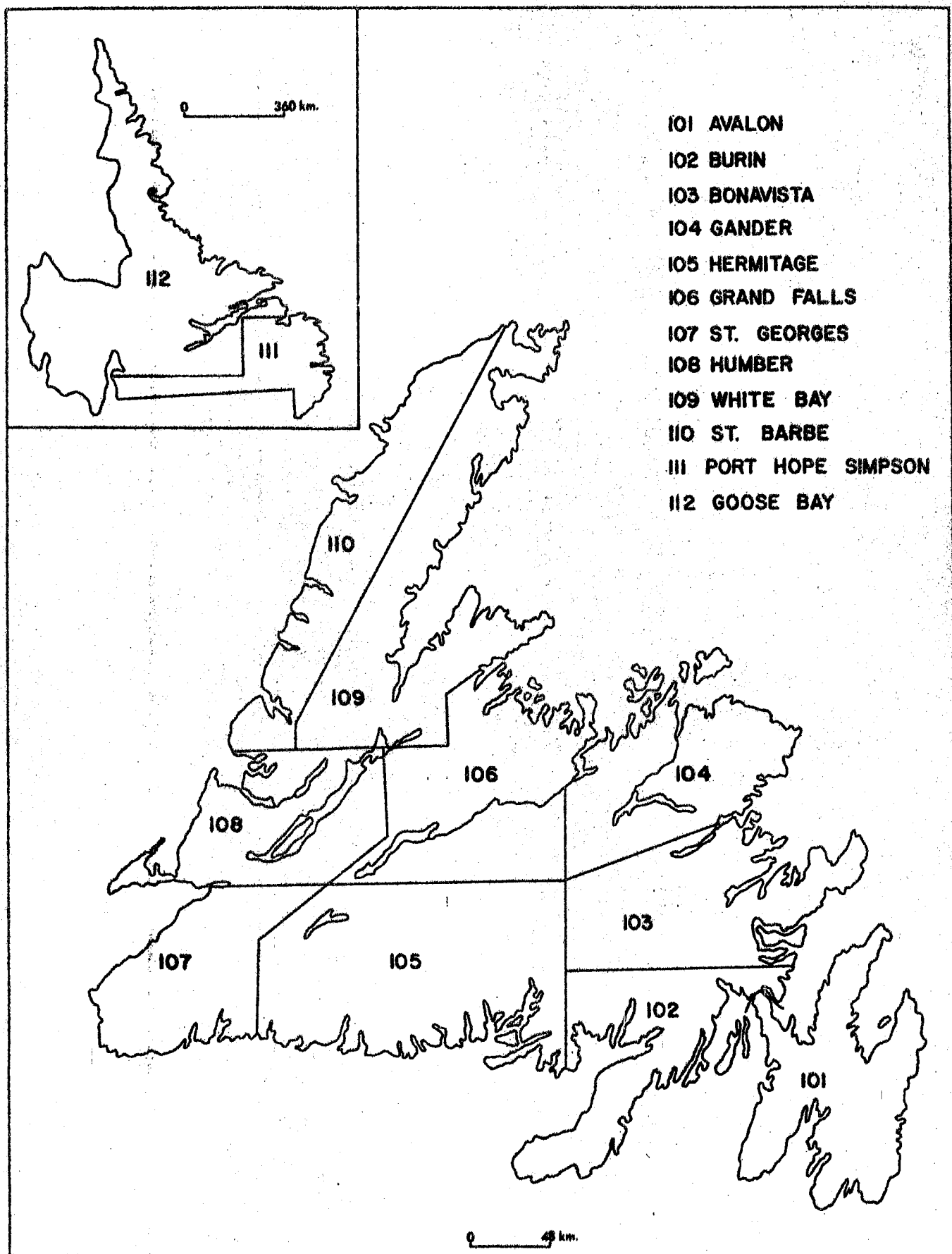


Fig. 1. Forest Insect and Disease Survey Districts.

Table 1.- Average number of spruce budworm larvae collected in ranger districts in 1980 by beating and branch sampling*.

District	No. trees sampled	No. larvae collected	Avg. no. larvae per tree sampled	No. branches sampled	No. larvae collected	Avg. no. larvae per branch
Eastern 101-102-103-104	108	9,498	87.9	52	721	13.9
Central 105-106	143	9,907	69.3	181	1,367	7.6
Western 107-108	156	6,477	41.5	61	1,023	16.8
Northern 109-110	99	649	6.6	21	305	14.5
Total	506	26,531	52.4	315	3,416	10.8

*One 45 cm branch-tip from the mid-crown of one tree.

Table 2.- Development of spruce budworm and balsam fir shoots in 1978, 1979, & 1980 in Newfoundland.

Location	Year	Dates of average shoot elongation								Larval instar					
		Terminal				North Lateral				L2 larvae in buds	Approx. dates of peak population				
		Bud burst	% of total		100%	Bud burst	% of total		100%		L3	L4	L5	L6	Pupation
Bottom Brook	1980	June 8	June 28	July 9	Aug 8	June 8	June 24	July 7	July 31	June 11	June 23	July 2	July 9	July 17	-
	1979	-	June 10	June 20	July 24	-	June 6	June 12	July 24	-	-	-	-	June 20	50% July 4
	1978	June 11	June 24	July 5	Aug 4	June 11	June 20	June 27	July 30	June 12	June 14	June 24	July 2	July 10	
Logging School Road	1980	June 14	July 4	July 15	Aug 8	June 14	June 26	July 6	Aug 8	-	-	-	-	-	-
	1979	May 21	June 12	June 23	July 23	-	June 6	June 12	July 10	-	-	-	-	-	-
	1978	June 13	June 24	July 6	Aug 2	June 13	June 21	June 29	July 21	-	June 17	June 24	July 3	July 10	-
South Brook Valley	1980	June 6	June 28	July 10	Aug 5	June 6	June 20	June 29	July 30	June 9	June 18	June 25	July 4	July 13	20% July 16
	1979	May 21	----- Defoliated -----				-----				May 24	-	June 7	-	June 21 95% July 3
	1978	June 6	June 14	June 21	July 19	June 5	June 11	June 16	July 11	June 10	June 12	June 19	June 29	July 4	100% July 12
0.4 km E. Soulis Brook	1980	June 5	June 23	June 28	July 23	June 5	-	June 22	July 23	June 12	June 20	June 27	July 3	July 11	90% July 22
Buchans Rd., 8.4 km from Badger	1980	June 6	June 27	July 12	Aug 1	June 6	-	June 23	July 23	June 11	June 16	June 27	July 4	July 11	100% July 17
Average	1980	June 8	June 28	July 10	Aug 5	June 8	-	June 30	July 30	June 11	June 19	June 28	July 5	July 13	-
	1979	May 23	June 10	June 21	July 19	May 23	June 7	June 12	July 11	May 24	June 5	June 8	June 15	June 22	July 5
	1978	June 10	June 21	July 1	July 28	June 5	June 16	June 23	July 19	June 11	June 16	June 24	July 1	July 7	July 12

Special collections of spruce budworm larvae were made for Drs. P.T. Dang of Ottawa, G.T. Harvey of Sault Ste. Marie and collections of hemlock looper for Dr. P.J. Silk of Fredericton.

Cool, wet weather occurred throughout most of the Province during the growing season. This inclement weather delayed spruce budworm development for two to three weeks in comparison to 1979, and severe defoliation did not occur until late July. Monthly maximum and minimum temperatures and total monthly precipitation for the Province for the past nine years are summarized in Table 3.

The spruce budworm, spruce coneworm and hemlock looper were the three most destructive forest pests during the year. Balsam woolly aphid numbers increased in western Newfoundland especially where spruce budworm populations had collapsed. The spruce beetle caused tree mortality in white spruce stands weakened by spruce budworm defoliation. The larch sawfly continued to cause severe defoliation to tamarack stands in western Newfoundland and in isolated stands in central Newfoundland. In Labrador the sawfly outbreak collapsed after causing extensive tree mortality. High population levels of the larch casebearer caused severe defoliation to young larch trees in several areas of eastern Newfoundland. The larch beetle became more widespread causing tree mortality throughout the Island. Ornamental pine trees in Pippy Park and near St. John's were severely defoliated by the European pine sawfly. The birch casebearer and satin moth were the major pests of hardwoods and both occurred in outbreak numbers on the Island. Other hardwood defoliators such as the birch leafminer, aspen leaf roller, mountain ash sawfly, uglynest caterpillar and the fall webworm occurred in small localized infestations.

Scleroderris canker continued to spread in 1980 and occurred at six more locations in the St. John's area. Witches' broom caused considerable infection and black spruce mortality in a few more areas in central Newfoundland. Broom rusts of fir and spruce continued to be the most conspicuous diseases on the Island. Armillaria root rot continued its damage in softwood plantations and insect-damaged softwood stands on the Island, and in mature stands in eastern Labrador. Dothichiza canker of lombardy poplar continued to be the primary killer of this tree throughout the Island.

IMPORTANT FOREST INSECTS

Spruce Budworm, Choristoneura fumiferana (Clem.) — The spruce budworm continued at outbreak levels in the Province in 1980 and light, moderate and severe defoliation was recorded on 1 071 711 ha compared to 1 251 300 ha in 1979. However, moderate and severe defoliation remained practically the same at 926 000 ha in 1980 (Fig. 2).

Table 3.- Temperatures and total precipitation for Newfoundland 1973-1980.

Year	Location	Temperature ($^{\circ}\text{C}$)								Precipitation (cm)			
		May		June		July		August		May	June	July	August
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.				
1973	St. John's	-2	19	-1	24	9	28	6	26	12.24	15.88	6.60	19.15
1974	"	-2	14	-1	28	1	26	5	24	10.87	6.12	9.12	14.40
1975	"	-2	22	0	26	2	29	5	27	22.02	11.18	1.93	14.53
1976	"	-2	22	0	28	-1	27	1	28	4.09	10.65	7.76	5.48
1977	"	-4	18	2	28	7	27	7	28	7.60	9.53	8.30	5.44
1978	"	-6	19	-1	26	7	26	4	29	4.77	5.72	8.31	4.96
1979	"	-2	23	-1	26	5	27	7	30	8.89	6.14	6.17	12.89
1980	"	-5	19	2	25	5	27	4	24	17.23	12.40	10.93	21.67
1973	Gander	-2	22	-1	28	8	29	5	24	9.83	14.63	5.92	16.21
1974	"	-3	14	-2	28	1	26	4	27	7.11	10.64	5.05	5.26
1975	"	-4	21	-2	25	5	34	5	29	17.93	2.44	6.20	6.03
1976	"	-3	25	-1	30	3	29	4	33	3.91	8.52	7.07	1.94
1977	"	-2	21	2	28	6	28	6	29	9.96	4.71	10.00	8.25
1978	"	-5	24	-2	27	7	29	4	29	3.94	5.84	7.00	5.59
1979	"	1	27	3	28	5	31	8	30	6.97	3.01	8.38	10.35
1980	"	-5	21	1	27	7	28	4	27	14.91	12.75	13.18	18.67
1973	Deer Lake	-3	23	-3	27	3	31	3	28	6.65	15.29	8.69	13.28
1974	"	-4	14	-4	31	0	29	-1	31	3.56	2.21	8.99	6.27
1975	"	-6	22	-3	27	1	33	0	31	6.60	4.72	3.71	8.10
1976	"	-5	28	0	29	4	32	-2	33	7.18	5.60	3.02	4.88
1977	"	-7	24	-2	29	4	29	-3	29	7.54	4.64	2.05	8.49
1978	"	-5	21	-3	28	3	31	0	28	3.86	7.52	10.24	6.09
1979	"	0	26	-1	30	2	30	2	30	5.33	3.61	11.58	7.83
1980	"	-6	22	-3	28	-1	29	0	26	5.84	8.68	14.32	14.03
1973	Goose Bay	-7	23	-1	31	6	33	2	28	3.33	11.30	12.06	6.53
1974	"	-5	14	-1	33	1	31	1	30	3.83	5.94	6.20	8.38
1975	"	-8	16	-1	27	4	37	2	27	1.93	7.62	6.83	6.17
1976	"	-4	21	-1	27	4	29	0	33	2.96	2.00	9.40	14.25
1977	"	-6	18	-1	31	5	32	6	30	11.61	5.80	9.63	10.69
1978	"	-7	26	-4	29	3	30	4	27	5.68	15.85	9.07	9.54
1979	"	-1	32	1	33	2	33	2	29	8.30	10.91	14.11	14.58
1980	"	-4	28	-4	28	3	31	7	30	10.82	19.22	11.03	4.87

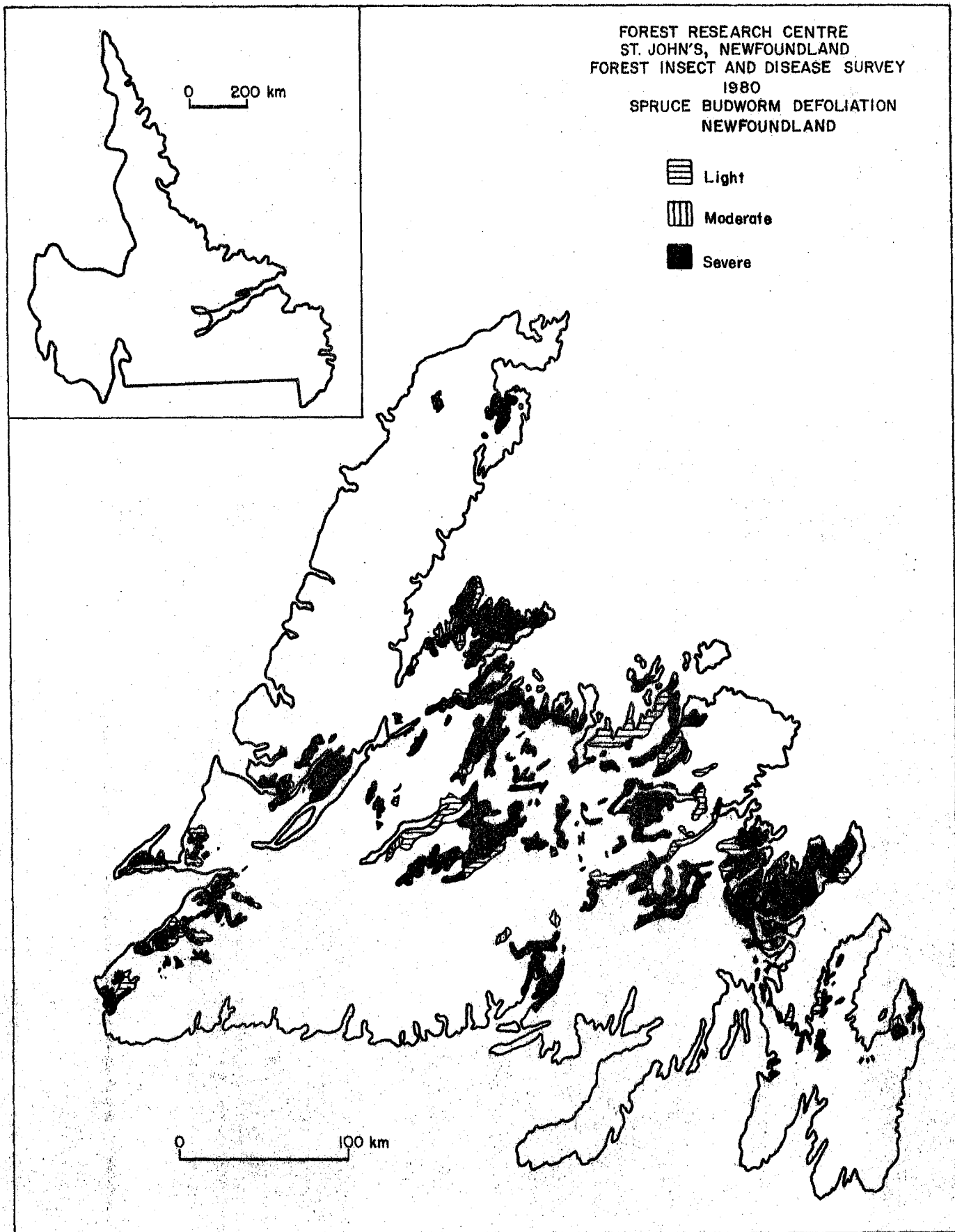


FIG. 2

In western Newfoundland most of the isolated patches of defoliation became more severe and widespread. Some of these pockets of infestation coalesced; particularly from Crabbes River to the Port au Port Peninsula, Corner Brook to Hughes Brook, and on the northern section of the Baie Verte Peninsula. Larval population levels also increased in the St. Andrews area and between Stephenville and Hawkes Bay where the outbreak had previously collapsed.

The main segment of the outbreak extended from Red Indian Lake and Twin Lakes to Bay d'Espoir east to Random Island including the Bonavista Peninsula (Table 4, Fig. 2). However, the extent of severe defoliation in central Newfoundland decreased in some areas. The red-dening of the foliage was less evident as the trees produced only small amounts of new shoots following several years of severe attack. Severe defoliation of stands in isolated areas of the Avalon Peninsula and the separated infestations near St. John's coalesced. Most of the black spruce stands from Bishop's Falls to Terra Nova in central and eastern Newfoundland were also infested by the spruce coneworm.

The total larval and pupal parasitism in 1980 was about 15%; 10% lower than in 1979. Glypta fumiferanae (Vier.) was the most common larval parasite, and Phaeogenes hariolus (Cress.) and Apechthis ontario (Cress.) continued to be two most numerous pupal parasites. One egg parasite, Trichogramma minutum Riley was found in late October on the Baie Verte Peninsula. Egg parasites had not been recovered before in Newfoundland.

Fungal infection, caused by Entomophthora egressa and E. sphaerosperma increased from negligible to about 10% in 1980. These fungi killed both larval and pupal stages of the host, and were widely distributed on the Island. Some budworm larvae were infected by another entomopathogenic fungus, Hirsutella sp. This fungus has been reported to cause mortality of spruce budworm in Ontario. Another fungus, tentatively identified as Paecilomyces sp., was also found on dead pupae. A microsporidian pathogen, Nosema fumiferanae (Thom.), was detected in the mid-gut tissues of many larvae.

The Provincial Department of Forest Resources and Lands treated about 12 500 ha of forest-improvement stands with Bacillus thuringiensis to prevent further accumulation of damage in these areas.

Mature Stands

Aerial assessment surveys, supplemented with ground checks, were completed in late July and August 1980. The survey classified the damaged merchantable forest stands according to the following categories:

Table 4.- Area (ha) of spruce budworm defoliation in productive forests of Newfoundland in 1980.

Management unit no.	Defoliation class [*]			Total
	Light	Moderate	Severe	
1A	212	1 032	17 325	18 569
1	6 852	942	31 213	39 007
2	5 095	5 225	138 642	148 962
4	11 656	331	59 294	71 281
5	21 850	-	57 888	79 738
6	2 381	1 606	53 840	57 827
7	946	6 565	36 721	44 232
8	29 240	-	55 645	84 885
9	12 632	8 214	210 911	231 757
10	2 551	-	33 319	35 870
11	2 938	-	46 993	49 931
12	24 412	1 874	36 661	62 947
14	24 309	4 907	61 135	90 351
15	-	2 030	32 789	34 819
16	192	102	4 961	5 255
18	435	-	15 845	16 280
Total	145 701	32 828	893 182	1 071 711

* Light: 1% to 25%
 Moderate: 26% to 75%
 Severe: 76% to 100%

- A - Dead: 50% or more of total volume of the stand dead.
- B - Moribund: 20% to 49% of total volume dead or more than 50% of total volume dying (dying = 75% or more total defoliation).
- C - Very severely damaged: 5% to 19% of total volume dead or less than 50% of total volume dying.
- D - Severely damaged: severe damage but less than 5% mortality or dying trees.

The total area of merchantable softwood stands with dead and dying trees, class A, B and C, decreased from about 517 800 ha in 1979 to 427 480 ha in 1980 (Table 3, Fig. 3, 4, 5, 6 & 7). These stands contained about 17 105 460 m³ of dead trees representing an increase of more than 6 825 300 m³ from 1979. The volume of dying trees in stands classified as A, B, and C decreased from 11 661 300 m³ in 1979 to about 4 734 200 m³ in 1980. The total volume of A, B, and C stands damaged was 40 086 300 m³ in 1980 compared to 38 412 000 m³ in 1979. It is difficult to compare the actual volume figures of 1980 with those of 1979 as the damaged areas were more accurately demarcated in 1980 and volume figures were obtained from the recently updated inventory tables. However, comparing the total volume of stands classified as A, B, and C in 1979 and in 1980 with their corresponding inventory data, the volume in these stands increased from about 17% of the total softwood volume in 1979 to about 23% in 1980.

A portion of the merchantable stands with tree mortality, class A, B, and C, were examined on the ground to determine the average age since the death of trees. Areas containing 9 067 043 m³ of dead wood were ground-checked, of these about 16% had been dead for six years or more and 1%, 7%, 11%, 10% and 55% had been dead for five, four, three, two, and one year respectively. The volume of timber dead for six or more years include stands weakened by previous insect outbreaks. The volume of blowdown trees was estimated at 25% of the total volume of 17 105 464 m³ of dead wood in damage classes A, B, and C.

The area and total stand volume of severely damaged forests, class D, was 1 550 108 ha and 1 049 812 m³ respectively (Table 6).

A severe windstorm in December 1979 caused a widespread blowdown of stands damaged by the spruce budworm. The volume of blowdown trees was estimated at 4 370 000 m³, or 25% of the volume of 17 105 000 m³ of tree mortality. The area of severely damaged productive stands was estimated at 426 569 ha.

Table 5.- Area and volume of productive, merchantable stands where tree mortality caused by the spruce budworm was evident in Newfoundland in 1980.

Provincial Management Unit	Ownership	Area and Volume Affected											
		A (Dead)				B (Moribund)				C (Very severe)			
		Area (ha)	Total Volume (m ³)	Dead Volume (m ³)	Dying Volume (m ³)	Area (ha)	Total Volume (m ³)	Dead Volume (m ³)	Dying Volume (m ³)	Area (ha)	Total Volume (m ³)	Dead Volume (m ³)	Dying Volume (m ³)
1	Crown	2556	178928	125250	-	4233	296366	22505	118135	1369	95819	-	26008
2	"	981	78525	48427	3405	3568	285512	56488	70211	2666	212553	11740	46071
4	Price	5755	494930	369464	95839	13073	1124278	249951	180843	3284	282424	30290	52407
5	Crown	-	-	-	-	1084	93224	29283	14361	4643	399298	36802	46511
	Bowater	300	25800	22403	2718	2039	175354	41247	47394	321	27606	2761	5522
	Price	156	13416	13416	-	3038	261268	77809	50127	178	15308	1531	3062
6	Crown	580	49880	19952	14964	-	-	-	-	-	-	-	-
	Bowater	13667	1175792	945983	61197	17641	1440310	390500	327346	2633	187518	21320	58048
	Price	865	74390	33660	24281	1459	125474	27531	36626	466	30756	3691	12302
7	Crown	11529	631411	432114	153319	12270	844214	162983	260029	4114	302955	24603	38142
8	"	8736	721619	550577	97175	9238	763920	273399	145630	5787	468747	59555	24776
	Bowater	-	-	-	-	1166	94446	39667	12278	-	-	-	-
9	Crown	5744	557168	270364	77899	4798	465406	113426	50682	1953	189441	20839	-
	Bowater	5607	549681	336752	18391	18136	1760284	442063	210381	4759	461623	50979	86438
	Price	3670	355990	193904	71964	-	-	-	-	952	92344	9234	27703
10	Crown	-	-	-	-	2383	240683	86646	19255	-	-	-	-
11	"	7619	700672	451701	146602	16529	1520668	510546	150194	2252	207184	24151	17094
12	"	4474	411608	317866	50469	10931	1005652	362317	123570	2315	212980	25309	10378
13	"	5139	472788	369348	2861	666	61272	26347	-	-	-	-	-
14	Crown	12127	1384971	950254	101808	16326	1779534	596587	318326	5988	652692	72765	49719
	Bowater	12054	1314636	1040898	172577	8829	962361	290522	113220	3621	394689	55396	26164
	Private	-	-	-	-	1341	146169	37707	4954	-	-	-	-
15	Crown	5612	611708	500364	32991	2318	252662	63022	19751	393	42837	5140	9424
	Bowater	28348	2944368	2198899	94512	8664	944376	345592	107406	7106	774554	78396	57808
16	Crown	2934	319806	160305	8531	1484	153212	55886	20719	-	-	-	-
	Bowater	6109	665227	450828	4433	4976	542384	171664	-	845	92105	9210	9210

Cont'd ...

Table 5 - Concluded

Provincial Management Unit	Ownership	Area and Volume Affected											
		A (Dead)				B (Moribund)				C (Very severe)			
		Area (ha)	Total Volume (m ³)	Dead Volume (m ³)	Dying Volume (m ³)	Area (ha)	Total Volume (m ³)	Dead Volume (m ³)	Dying Volume (m ³)	Area (ha)	Total Volume (m ³)	Dead Volume (m ³)	Dying Volume (m ³)
17	Crown	4930	394678	293686	15896	1374	124512	42615	8393	2811	248250	24825	-
	Bowater	5333	405308	213762	96936	1366	107416	26183	-	934	87616	8762	-
	Price	37	2812	2812	-	155	11780	3298	-	-	-	-	-
18	Bowater	2042	285880	200004	8560	2159	302260	55692	21041	-	-	-	-
	GMNP	2732	269872	196069	12260	2452	240895	129496	-	8298	756672	113586	-
	TNNP	664	53148	26574	6865	847	68107	22804	11811	408	32695	3277	5177
Total	Crown	55729	4928694	3351293	505988	59076	5299245	1502840	1045492	29724	2612592	256269	240651
	Bowater	73460	7366692	5409529	459324	64976	6329191	1803130	839066	20219	2025711	226824	243190
	Price	36509	3414800	2197741	459092	58735	5411676	1692618	711645	12310	1130159	135707	188721
	GMNP	2732	269872	196069	12260	2452	240895	129496	-	8298	756672	113586	-
	TNNP	664	53148	26574	6865	847	68107	22804	11811	408	32695	3277	5177
	Private	-	-	-	-	1341	146169	37707	4954	-	-	-	-
TOTAL		169094	16033206	11181206	1443529	187427	17495283	5188595	2612968	70959	6557829	735663	677739

Total Area A, B, C 427 480 ha
 Total Volume A, B, C 40 086 318 m³
 Total Dead Vol. A, B, C 17 105 464 m³
 Total Dying Vol. A, B, C 4 734 236 m³

FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1980
SPRUCE BUDWORM DAMAGE ASSESSMENT
DISTRICTS 101 AND 102

- Dead
- ▨ Dying
- ▨ Very severe damage

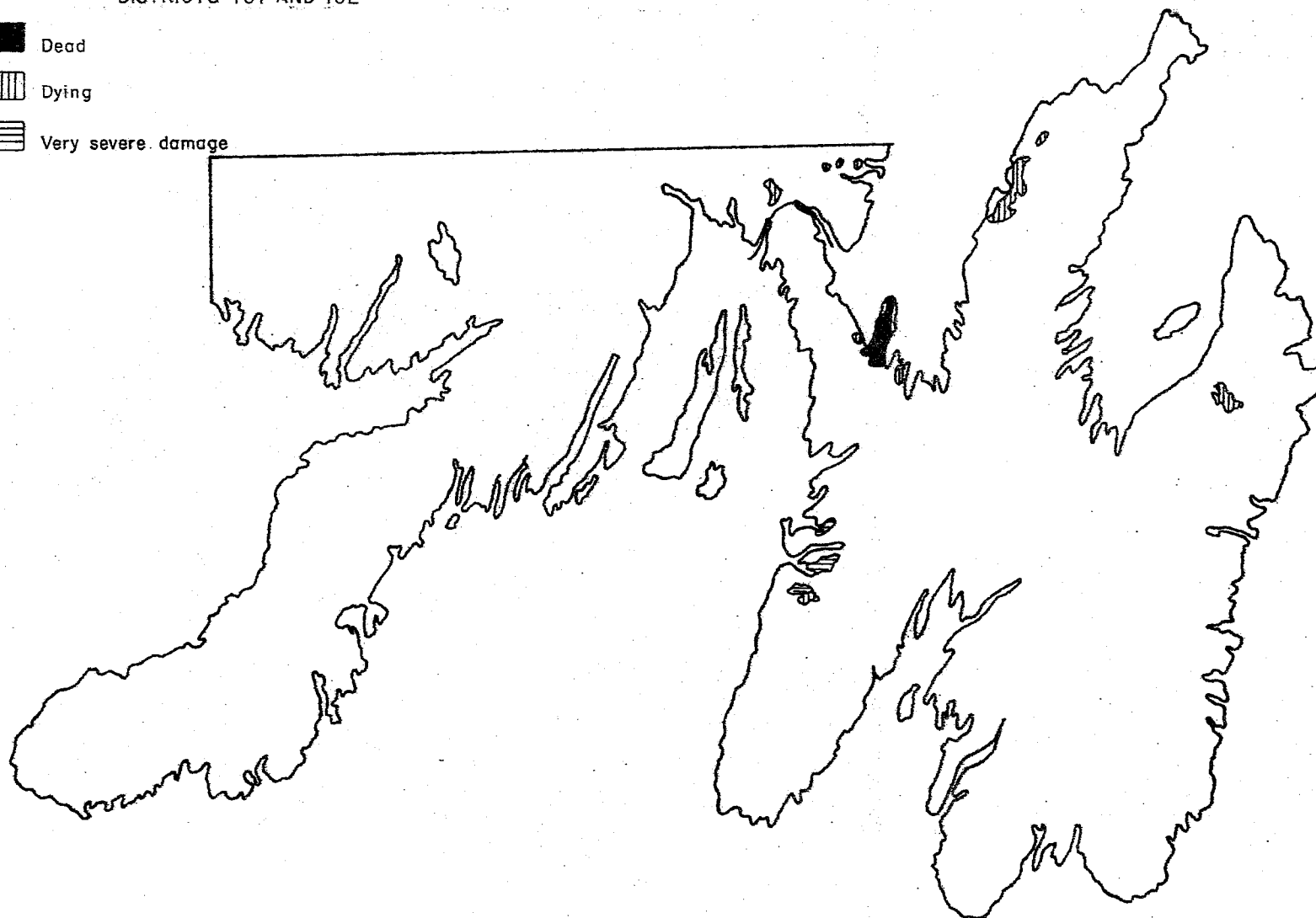


FIG. 3

FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1980
SPRUCE BUDWORM DAMAGE ASSESSMENT
DISTRICTS 103 AND 104

MATURE STANDS

- Dead
- ▨ Dying
- ▧ Very severe damage
- ▩ Severe damage

IMMATURE STANDS

- ▤ Dead
- ▥ Dying
- ▦ Very severe damage

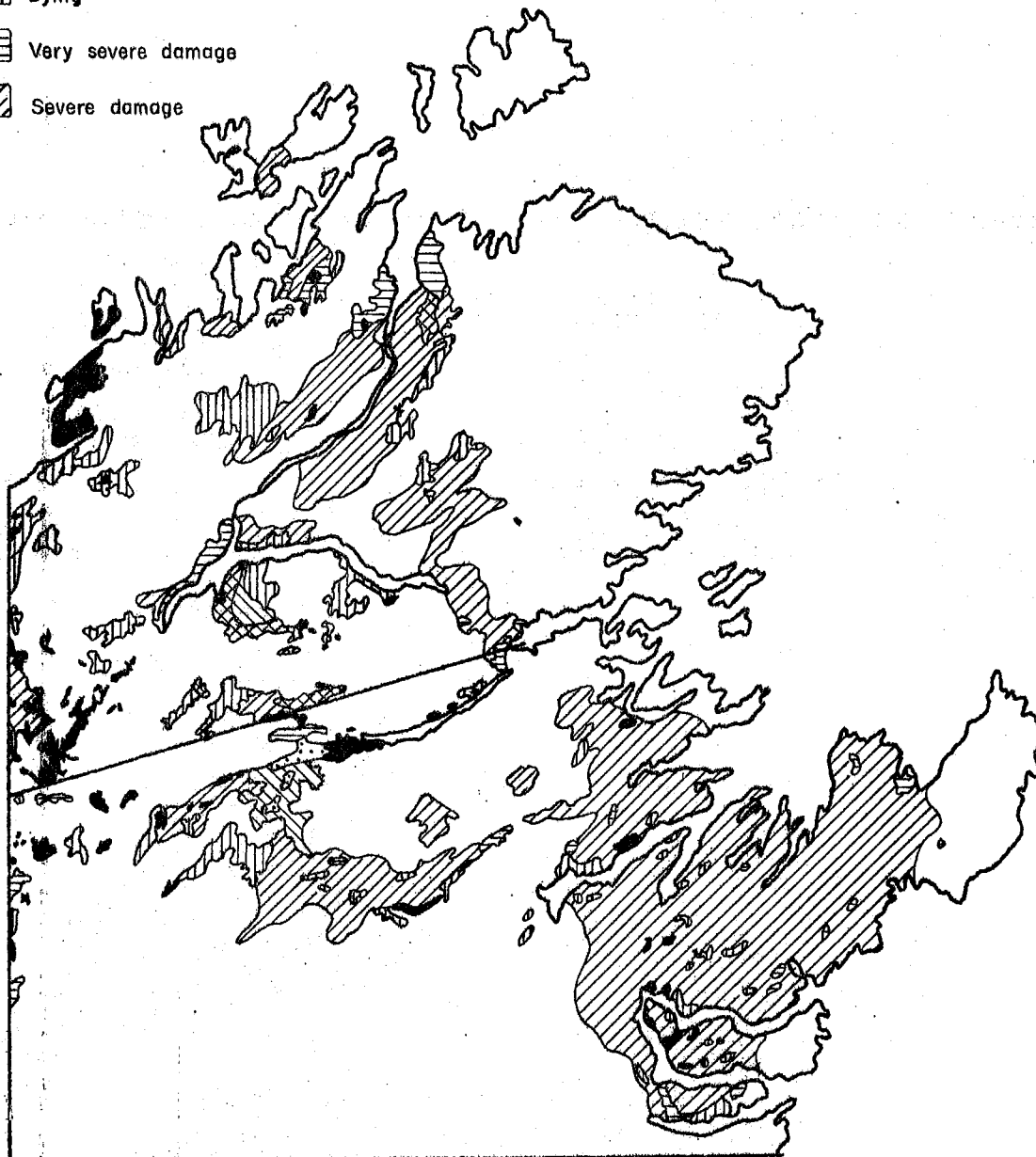


FIG. 4

FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1980
SPRUCE BUDWORM DAMAGE ASSESSMENT
DISTRICTS 105 AND 106
MATURE STANDS

- Dead
- ▨ Dying
- ▨ Very severe damage
- ▨ Severe damage

IMMATURE STANDS

- ▨ Dead
- ▨ Dying
- ▨ Very severe damage

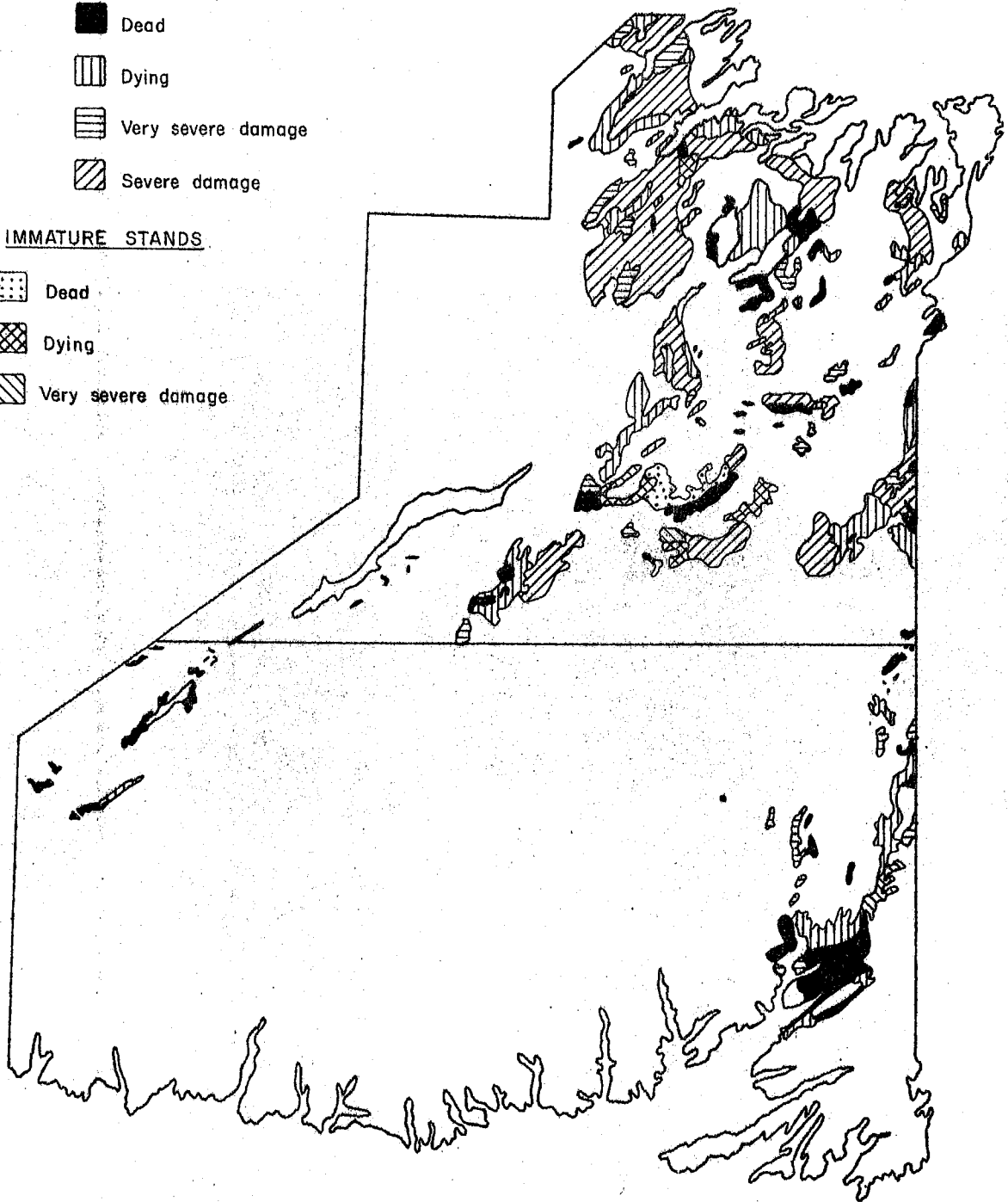


FIG. 5

FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1980
SPRUCE BUDWORM DAMAGE ASSESSMENT
DISTRICTS 107 AND 108

MATURE STANDS

- Dead
- ▨ Dying
- ▧ Very severe damage
- ▩ Severe damage

IMMATURE STANDS

- ▤ Dead

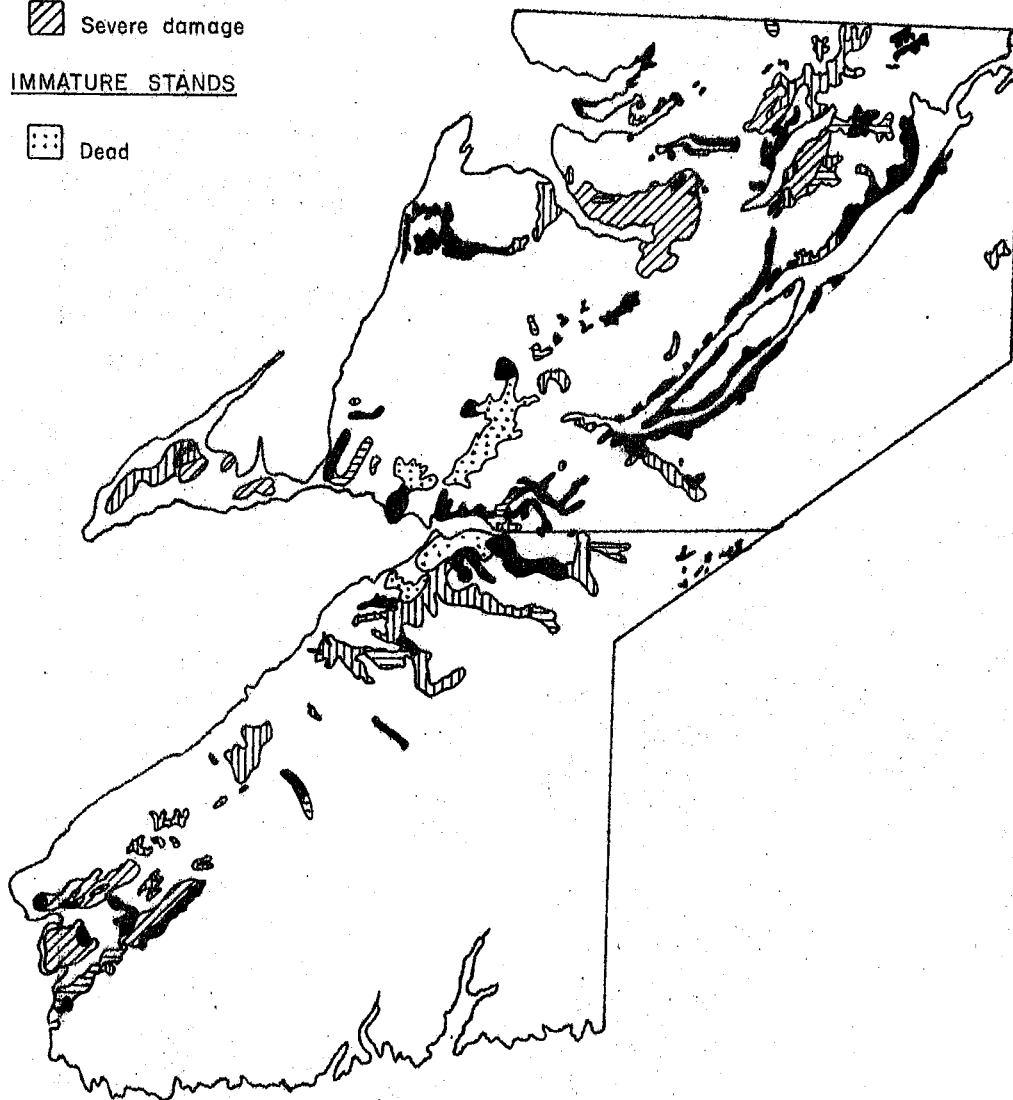


FIG. 6

FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1980
SPRUCE BUDWORM DAMAGE ASSESSMENT
DISTRICTS 109 AND 110

MATURE STANDS

- Dead
- ▨ Dying
- ▤ Very severe damage
- ▧ Severe damage

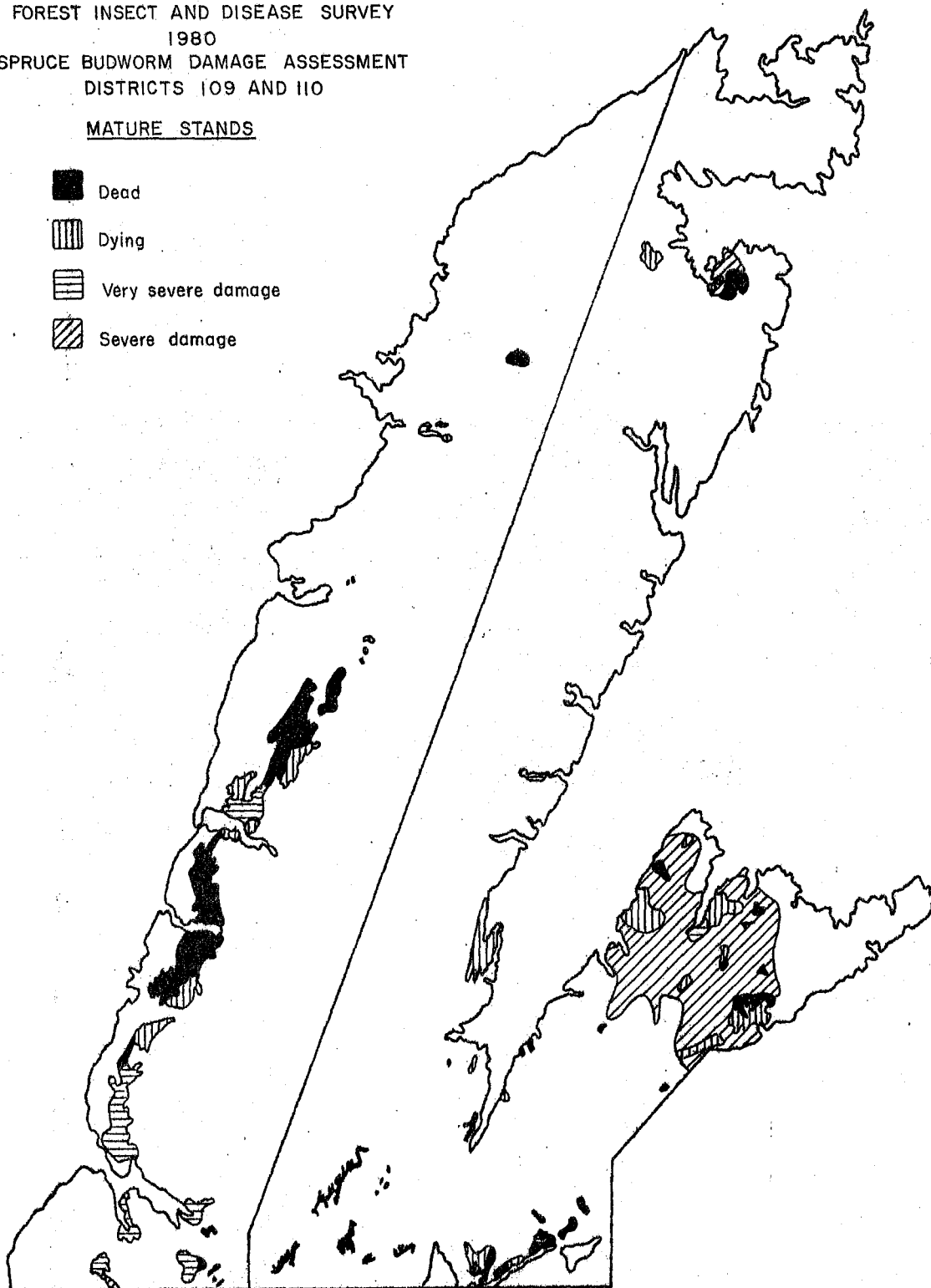


FIG. 7

Table 6.- Area and total stand volume of productive, merchantable stands severely damaged (D) by the spruce budworm in Newfoundland in 1980.

Unit No.	Productive (ha)
2	125 401
4	29 515
5	45 340
6	5 471
8	19 305
9	110 127
10	15 039
11	17 126
12	6 372
14	11 329
15	18 023
18	1 618
Terra Nova National Park	21 903
TOTAL	426 569

Immature Stands

Budworm damage in young balsam fir stands on the Island was also assessed. These stands were classified for the second year by damage categories as follows:

- a --50% or more of total stems in stand dead.
- b - 20% to 49% of total stems dead or more than 50% of total stems dying (dying = 90% or more total defoliation).
- c - 5% to 19% of total stems dead or less than 50% of total stems dying.
- d - moderate to severe damage but less than 5% of the total stems dead or dying trees.

The total area of very severely damaged immature stands, classes a, b, and c, with tree mortality increased from 46 600 ha in 1979 to 62 590 ha in 1980 (Table 7). This addition was due mainly to the increase in the area of damaged stands in central and eastern Newfoundland. Most of the immature stands in the western areas have had no defoliation since 1977 and tree mortality did not increase appreciably in 1980.

Egg-mass and overwintering larvae populations were surveyed with over 800 sample points across the Island. Based on these surveys the area of moderate and severe defoliation in western Newfoundland is expected to increase between Codroy Valley and Deer Lake and on the northern section of the Baie Verte Peninsula (Fig. 8). The area of moderate and severe defoliation is forecast to decrease along the northeast coast from Green Bay to Bonavista Bay. However, inland in central Newfoundland severe defoliation is expected to occur from Red Indian Lake to Random Island including the Bonavista Peninsula. Severe defoliation is also forecast for the Bay d'Espoir area and two separate areas on the Avalon Peninsula. The total area of moderate and severe defoliation in the productive forests of the Island is forecast to be about 800 000 ha in 1981 (Table 9).

Population levels, as indicated by the number of egg-masses per 10 m² of foliage, are expected to remain about the same as last year (Table 8).

Table 7.- Areas of productive submerchantable stands where tree mortality was evident in 1980.

Management unit	Ownership	Area (ha) by damage category*			Total area (ha)
		a	b	c	
4	Price	4 720	1 965	6 693	13 378
5	Crown	-	2 220	-	2 220
	Bowater	-	183	-	183
6	"	-	6 496	3 348	9 844
	Price	-	1 323	195	1 518
7	Crown	-	327	2 483	2 810
9	"	443	973	-	1 416
	Bowater	-	1 401	-	1 401
10	Price	2 096	-	-	2 096
11	"	3 293	5 669	923	9 885
14	Crown	8 600	1 161	-	9 761
	Bowater	5 368	1 242	595	7 205
15	"	873	-	-	873
<hr/>					
All	Crown	9 043	4 681	2 483	16 207
	Bowater	6 241	9 322	3 943	19 506
	Price	10 109	8 952	7 811	26 877
<hr/>					
Total Island		25 393	22 960	14 237	62 590

- *
a: 50% or more of total stems in stand dead.
b: 20% to 49% of total stems dead or more than 50% of total stems dying. Dying = 90% or more total defoliation.
c: 5% to 19% of total stems dead or less than 50% of total stems dying.

FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1980
NEWFOUNDLAND

■ Forecast moderate and severe spruce budworm defoliation for 1981.

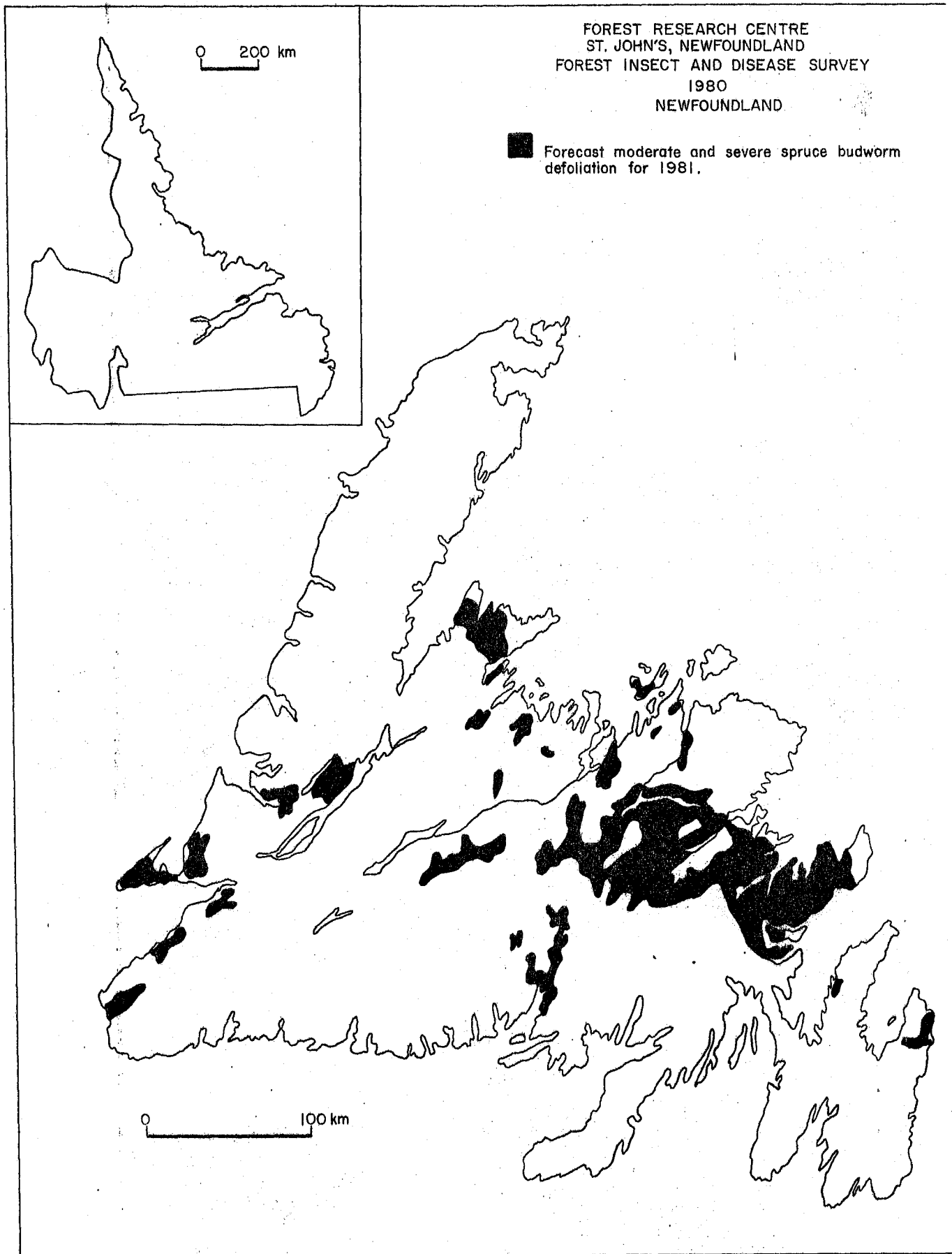


FIG. 8

Table 8. Summary of spruce budworm egg-mass numbers per 10 m² of foliage for sample points with moderate and severe defoliation forecast in Newfoundland from 1978 to 1980.

Year	Moderate defoliation forecast*		Severe defoliation forecast*	
	No. sample points	Avg. EM/10 m ²	No. sample points	Avg. EM/10 m ²
1980	49	149	123	437
1979	65	149	149	438
1978	72	154	124	491

* Class limits for defoliation forecast based on egg-masses per 10 m² of foliage:

No. egg-mass/10 m ²	
Nil	0
Low	1 to 106
Medium	107 to 257
High	257+

Defoliation forecast	
Nil	0%
Light	1% to 25%
Moderate	26% to 75%
Severe	76% to 100%

Table 9. Areas of moderate and severe defoliation and moderate to high hazard forecast in productive forests of Newfoundland for 1981.

Management unit no.	Ownership	Moderate and severe defoliation (ha)	Moderate to high hazard (ha)
1A	Crown	11 982	11 982
1	"	1 503	1 503
2	"	136 564	136 564
4	Price	123 880	123 880
5	Crown	25 090	24 887
5	Bowater	14 954	18 789
5	Price	7 052	13 237
6	Crown	1 321	1 321
6	Bowater	104 179	104 179
6	Price	7 283	7 283
7	Crown	23 465	23 465
7	Bowater	19 030	20 063
8	Crown	11 831	6 017
8	Bowater	1 397	1 397
9	Crown	14 240	22 435
9	Bowater	52 024	52 840
9	Price	2 071	2 071
10	Crown	181	181
10	Price	14 557	16 596
11	Bowater	491	491
11	Price	41 398	38 430
12	"	32 900	18 436
14	Crown	58 491	43 311
14	Bowater	20 538	20 580
15	Crown	7 188	7 188
15	Bowater	31 614	31 614
16	Bowater	1 020	1 020
	TNNP	25 784	25 784
	Private	5 468	4 058
All	Crown	291 856	278 854
	Bowater	245 247	250 973
	Price	229 141	219 933
	TNNP	25 784	25 784
	Private	5 468	4 058
Total Island		797 496	779 602

Spruce budworm damage hazard areas were delineated based on the egg-mass and overwintering larval surveys, on the severity of current and previous years' defoliation and on tree vigour. Moderate to high rating indicates that tree vigour will be reduced and some top killing is expected. Very high hazard denotes that extensive top killing and tree mortality are expected. Based on the egg-mass and overwintering larval surveys, moderate to high hazard with high populations are expected in about 780 000 ha in 1981 (Table 9, Fig. 9). This total includes some areas already in the very high hazard category as indicated by the presence of tree mortality. It is evident that almost all of the area of moderate and severe defoliation forecast for 1981 falls in the moderate to very high hazard category indicating the need for foliage protection to prevent further accumulation of damage in these areas.

Eastern Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Guen.) —

High population levels of the looper were again recorded in mature stands of balsam fir near the headwaters of Salmon River and Main Brook on the Northern Peninsula. In 1980 a new infestation was found near Leg Pond. The total infested area of these infestations was 10 110 ha and the volume of dead and dying stands was estimated at 195 430 m³. Approximately 5000 late instar larvae were collected from 40 trees in the Leg Pond infestations. Larvae collected from the Salmon River and Main Brook infestations were infested by a fungal disease caused by *Entomophthora* sp. A viral disease was also detected in the populations. These infestations are forecast to collapse in 1981. Larval populations were very low throughout central Newfoundland and no significant numbers of adults were sighted. The average number of larvae per tree sample and number of collections for the Island are as follows:

Year	No. of Collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1980	24	0.3	0.7	6.0

Spruce Coneworm, *Dioryctria reniculelloides* M & M — Although the area of infestation decreased from last year, population levels remained high in black spruce stands near Rattling Brook, Norris Arm Road, Great Rattling Brook, Northwest Gander River, Bay d'Espoir Road, Jumpers Brook Road, Northern Arm, Laurenceton, Loon Bay, Traytown and Terra Nova Village. Low numbers were collected near Aspen Brook in a forest improvement area treated with *Bacillus thuringiensis* for spruce budworm control.

Spruce budworm damage hazard areas were delineated based on the egg-mass and overwintering larval surveys, on the severity of current and previous years' defoliation and on tree vigour. Moderate to high rating indicates that tree vigour will be reduced and some top killing is expected. Very high hazard denotes that extensive top killing and tree mortality are expected. Based on the egg-mass and overwintering larval surveys, moderate to high hazard with high populations are expected in about 780 000 ha in 1981 (Table 9, Fig. 9). This total includes some areas already in the very high hazard category as indicated by the presence of tree mortality. It is evident that almost all of the area of moderate and severe defoliation forecast for 1981 falls in the moderate to very high hazard category indicating the need for foliage protection to prevent further accumulation of damage in these areas.

Eastern Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Guen.) —

High population levels of the looper were again recorded in mature stands of balsam fir near the headwaters of Salmon River and Main Brook on the Northern Peninsula. In 1980 a new infestation was found near Leg Pond. The total infested area of these infestations was 10 110 ha and the volume of dead and dying stands was estimated at 195 430 m³. Approximately 5000 late instar larvae were collected from 40 trees in the Leg Pond infestations. Larvae collected from the Salmon River and Main Brook infestations were infested by a fungal disease caused by *Entomophthora* sp. A viral disease was also detected in the populations. These infestations are forecast to collapse in 1981. Larval populations were very low throughout central Newfoundland and no significant numbers of adults were sighted. The average number of larvae per tree sample and number of collections for the Island are as follows:

Year	No. of Collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1980	24	0.3	0.7	6.0

Spruce Coneworm, *Dioryctria reniculelloides* M & M — Although the area of infestation decreased from last year, population levels remained high in black spruce stands near Rattling Brook, Norris Arm Road, Great Rattling Brook, Northwest Gander River, Bay d'Espoir Road, Jumpers Brook Road, Northern Arm, Laurenceton, Loon Bay, Traytown and Terra Nova Village. Low numbers were collected near Aspen Brook in a forest improvement area treated with *Bacillus thuringiensis* for spruce budworm control.

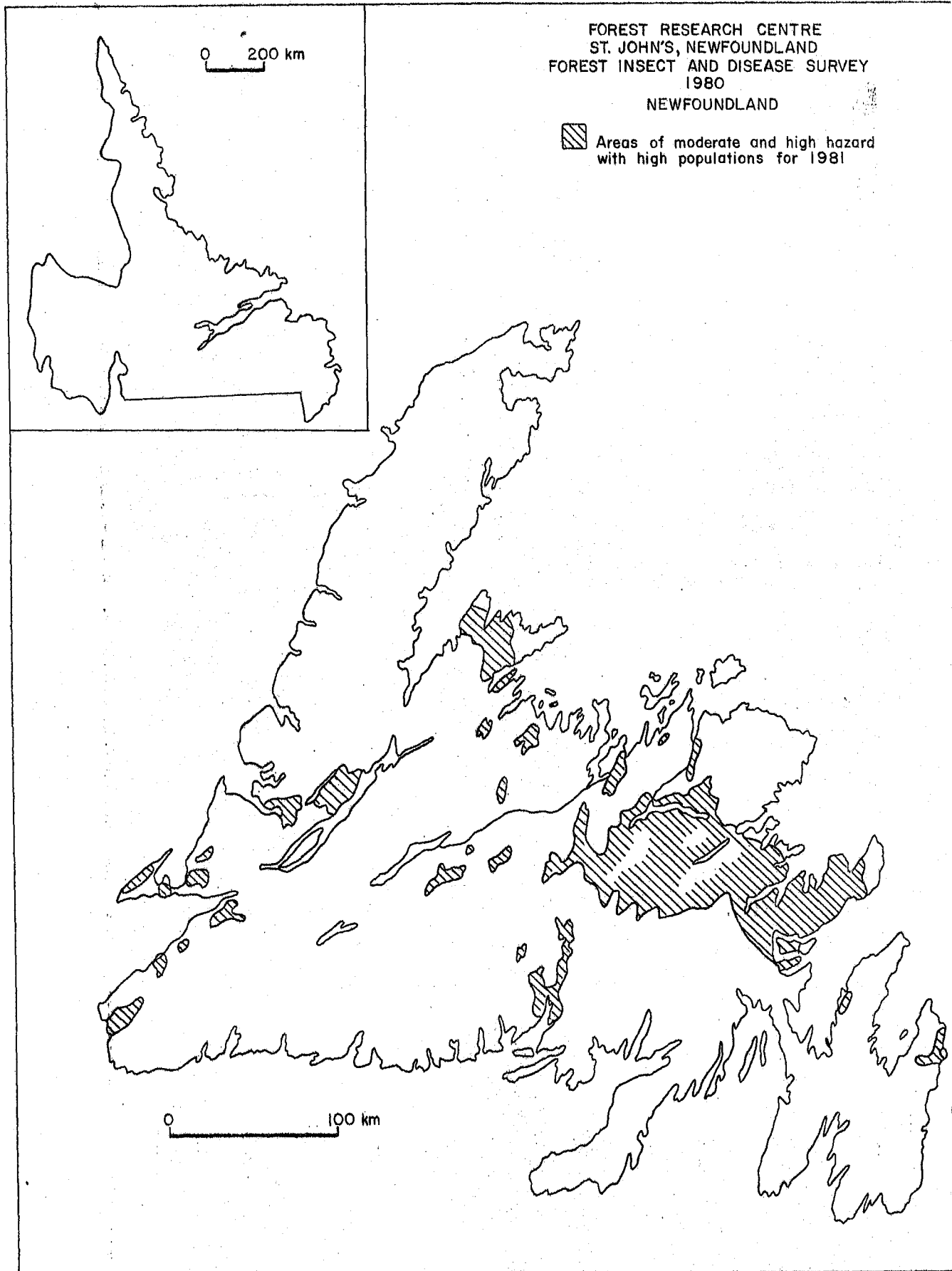


FIG. 9

Year	No. of Collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1980	34	0.2	12.7	68.6

Balsam Woolly Aphid, *Adelges piceae* (Ratz.) — Population levels of the aphid have been increasing in western Newfoundland during the past two years. Recent surveys detected light damage of immature balsam fir from the Codroy Valley to St. Georges Bay. Balsam fir comprises over 85% of the stands in this area. The aphid was first recorded in 1949 in the Codroy Valley and spread across the Island until 1967 when the outbreak subsided. Since then only small isolated infestations remained. It is difficult to forecast the course of the new infestations in view of the increasing budworm populations in western Newfoundland.

Larch Sawfly, *Pristiphora erichsonii* (Htg.) — Population levels increased and defoliation was more widespread in the outbreak that extended from the Codroy Valley to Birchy Lake and along the Northern Peninsula to Round Lake. In central Newfoundland isolated patches of infestation were recorded near Buchans, Buchans Junction, Exploits Dam, Millertown Junction and along the Bay d'Espoir Road.

In Labrador an outbreak which started in 1975 has terminated after causing 70% to 80% tree mortality in stands from Winokapau Lake to Cartwright and from Grand Lake south to Park Lake.

In sawfly infested stands in western Newfoundland population levels of the introduced shrew, *Sorex cinereus cinereus* Kerr., were 10.77/ha as compared to 3.24/ha in central and 4.84 in eastern Newfoundland where sawfly populations were low.

Year	No. of Collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1980	2	200	250	300

Larch Casebearer, *Coleophora laricella* (Hbn.) — High numbers and severe defoliation were recorded in small localized groups of trees in the Terra Nova National Park and on the Burin and Avalon peninsulas. In Terra Nova National Park several infestations of the casebearer were recorded. Moderate and severe defoliation, of up to 100%, occurred in a one ha and one-half ha area 2 km and 5 km north of Park Headquarters and in a 2 ha area between Sandy Pond Junction and Terra Nova Road.

Light defoliation occurred for about 1 km along the Terra Nova Road and in a one-half ha area about 5 km north of Park Headquarters. Severe damage was also recorded near Winterland on the Burin Peninsula, in the Salmonier Valley, near Newtown and along Thorburn Road near St. John's.

Larch Bark Beetle, *Dendroctonus simplex* Le Conte — Tree mortality was common along the Trans Canada Highway from the Codroy Valley to Gander and along secondary roads throughout central Newfoundland. The most noticeable damage and tree mortality occurred throughout central Newfoundland where tamarack has been weakened by spruce budworm defoliation.

Spruce Beetle, *Dendroctonus rufipennis* Kby. — A severe outbreak of this insect caused mortality in stands of mature white spruce along Stag Lake Road, on the north and south sides of Bay of Islands, Goose Arm, Pasadena and in the Bonne Bay areas in western Newfoundland. These stands had been weakened by spruce budworm attack over the past six years. This outbreak is expected to continue and spread to adjacent areas.

Birch Casebearer, *Coleophora fuscedinella* (Zell.) — Generally low population levels occurred throughout western Newfoundland with moderate patches of defoliation between Corner Brook and Baie Verte. In central Newfoundland moderate and severe defoliation of semi-mature stands occurred throughout all districts. In eastern areas severe defoliation was reported throughout the Terra Nova National Park and on the Bonavista and Avalon peninsulas. Some branch dieback was evident where severe defoliation occurred but no tree mortality was recorded.

<u>Year</u>	<u>No. of Collections</u>	<u>No. of larvae per tree sample</u>		
		<u>Min.</u>	<u>Avg.</u>	<u>Max.</u>
1980	60	1.3	13.0	43.0

Satin Moth, *Leucoma salicis* (L.) — High population levels of this insect caused severe defoliation in patches of balsam poplar from St. Andrews to Fischell's River. The small infestation in the Stephenville area collapsed after ornamental willow trees were killed by a willow blight. The outbreak continued on the Avalon Peninsula with reports of severe defoliation of ornamental poplars and willows throughout St. John's, Mount Pearl, Bay Bulls, Portugal Cove, St. Thomas and Carbonear areas.

<u>Year</u>	<u>No. of Collections</u>	<u>No. of larvae per tree sample</u>		
		<u>Min.</u>	<u>Avg.</u>	<u>Max.</u>
1980	2	5.0	9.5	14.0

OTHER NOTEWORTHY INSECTS

Species	Host(s)	Locality	Average per tree	No. of Collections
<u>Acleris variana</u> (Fern.) Eastern blackheaded budworm	wS, bF	Great Gull Lake, Bottom Brk. Rd., 2.0 km N. Sally's Cove	0.4	3
<u>Adalia bipunctata</u> (L.) Twospotted lady beetle	Northern wild raisin	Pasadena Nursery	2.0	1
<u>Agonopterix</u> sp. A webworm	wild parsnip	Blue Gulch Pond Road	5.0	1
<u>Ampedes apicatus</u> Say A click beetle	tA	Jct. Pamehac & Sandy Lake Rd., River of Ponds	0.5	2
<u>Ampedes nigrinus</u> (Hbst.) A click beetle	bF	1.0 km N. Baker's Brk. (GMNP)	0.7	1
<u>Anatis mali</u> (Say) Eye-spotted lady beetle	tL	Stag Lake Park	0.3	1
<u>Anoplonyx luteipes</u> (Cress) Marlatt's larch sawfly	tL	Bay D'Espoir Rd.	6.0	1
<u>Archips cerasivoranus</u> (Fitch.) Uglynest caterpillar	choke cherry	Flat Bay Bk. Steel Mtn. Rd.	150.0	2
<u>Archips myricanus</u> McD. A leafroller	choke cherry	Pasadena, Reidville Rocky Brk., Gander, Grand Falls	0.3	4
<u>Archips rosanus</u> (Linn.) European leafroller	W, Sal, Ash rM, choke cherry	New Bay Pond, Districts 107 & 108	6.6	9
<u>Cenopis acerivorana</u> Mack. A leafroller	rM	Norris Arm	12.0	1

Cont'd ...

OTHER NOTEWORTHY INSECTS (Continued)

Species	Host(s)	Locality	Average per tree	No. of Collections
<u>Cenopsis pettitana</u> (Rob.) Pettit leafroller	rM	Rattling Brook	4.0	1
<u>Choristoneura conflictana</u> (Wlk.) Large aspen tortrix	tA	Buchans Jct., Jct. Birchy Bay & Chapel Island Rds., Square Pond Prov. Park	1.4	7
<u>Choristoneura rosaceana</u> (Harr.) Obliquebanded leafroller	Sal, tA, rM	Districts 104, 106 & 107	1.6	6
<u>Chrysomela mainensis mainensis</u> Bech. Alder leaf beetle	Sal, W	Districts 103, 104, 105, 106 & 108	4.8	10
<u>Clepsis persicana</u> Fitch White-triangle leafroller	bF	Deer Lake	0.5	1
<u>Cinara</u> sp. An aphid	bF	12.8 km N. Cormack	3.0	1
<u>Compsolechia</u> sp. A leafroller	tA	Sheffield Lake Rd.	3.3	1
<u>Corythucha pergandi</u> Heid. Alder lace bug	Sal	Bread Cove Brk. (TNMP)	5.0	1
<u>Ctenicera resplendens aeraria</u> Rand. A click beetle	bF	4 km S. Parson's Road	0.3	1
<u>Ctenicera triundulata</u> (Rand.) A click beetle	tL, bS	Star Lake Rd., Exploit's Dam Shanadithit Brk.	0.4	4

Cont'd ...

OTHER NOTEWORTHY INSECTS (Continued)

Species	Host(s)	Locality	Average per tree	No. of Collections
<u>Dendroctonus rufipennis</u> (Kby.) Spruce beetle	wS	Halfway Point, Cook's Brk. Pasadena	9.5	2
<u>Dysstroma citrata</u> Linn. A looper	wB	Jct. Rattling Brk. & Bay d'Espoir Rds.	0.3	1
<u>Epinotia cruciana</u> Linn. A leafroller	W	Grand Lake Brk.	10.0	1
<u>Epinotia similana</u> (Hbn.) A leafroller	wB	Wiley Brk., Swanger Cove, Conne River Pond, Logging School Rd., Burgeo Rd., Trout Brk., T.N.N. Park	1.6	8
<u>Eriophyes</u> sp. Leaf mites	rM	Jct. Norris Arm & TCH., 6.5 km S. of Pt. Leamington	25.0	2
<u>Eulithis serrataria</u> (B & McD.) A looper	Sal	Grand Lake Brk.	1.0	1
<u>Eupithecia</u> sp. Brown spruce looper	bS, bF, wS	8 km E. Port Blandford, T.N.N. Park, Glovers Hr. & Leading Tickles Jct., Districts 107 & 108	0.7	11
<u>Femusa dohrnii</u> (Tischb.) European alder leafminer	Sal	Jct. TCH. & Blue Hill Rd. (TNNP)	10.0	1
<u>Femusa pusilla</u> (Lep.) Birch leafminer	wB	Mummichog Prov. Park, 7.8 km W. of Gander, 8.0 km E. of Terra Nova Village, District 103	15.4	9
<u>Feralia jocosa</u> (Guen.) Red-marked caterpillar	bF, wS	1.5 km W. of Pt. Leamington, 2.6 km N. of Roddickton, Burgeo Rd.	0.3	3

Cont'd ...

OTHER NOTEWORTHY INSECTS (Continued)

Species	Host(s)	Locality	Average per tree	No. of Collections
<u>Gilpinia hercyniae</u> (Htg.) European spruce sawfly	wS	Pasadena Field Stn., Burgeo Rd.	1.5	2
<u>Griselda radicana</u> Wlshm. Redstriped spruce shoot moth	bF	Burgeo Rd.	0.3	1
<u>Hedia variegana</u> (Hbn.) Green budworm	Ash, wB	Pasadena Nursery, Cook's Brk., Comme River Pond	16.3	3
<u>Hylobius</u> sp. Root collar weevil	bF	1.6 km S.W. Wild Bight (Beachside)	0.5	1
<u>Mindarus abietinus</u> Koch Balsam twig aphid	bF	Baker's Br. (GMNP), Berry Hill (GMNP), Nicholsville, Districts 104 & 106	7.1	7
<u>Nadata gibbosa</u> (J.E. Smith) Green oak caterpillar	tA	Square Pond Prov. Park	1.0	1
<u>Nematus</u> sp. A willow sawfly	W	Glenwood Prov. Park, Pt. Leamington Jct. Rattling Brk. & Bay d'Espoir Rds.	1.0	3
<u>Neodiprion abietis</u> complex Balsam fir sawfly	bF, wS	Bottle Pond Rd., 3.2 km N.E. of Cormack	0.4	4
<u>Nycteola cinerana</u> N. & D. Poplar leaf-tier	W	1 km W. Logging School Rd. (TCH) Pt. Leamington, Glenwood Prov. Park, Jct. Rattling Br. & Bay d'Espoir Rd.	1.8	4
<u>Nyctobia limitaria</u> (Wlk.) Green balsam looper	bF, wS	Bottle Pond Rd., Bottom Brk. Rd. 4.0 km E. Bunyan's Cove	0.4	4
<u>Orgyia antiqua</u> (L.) Rusty tussock moth	tL	Bay d'Espoir Rd.	1.0	1

Cont'd ...

OTHER NOTEWORTHY INSECTS (Continued)

Species	Host(s)	Locality	Average per tree	No. of Collections
<u>Orthosia hibisci</u> Gn. Green fruitworm	Sal, Pch	Steel Mtn. Rd., Jumper's Brk. Rd.	0.5	2
<u>Pandemis canadana</u> Kft. A leafroller	tA	Pilley's Island Causeway	0.3	1
<u>Phratora purpurea purpurea</u> Brown Aspen leaf beetle	W	Blue Gulch Pond Rd.	0.3	1
<u>Pikonema alaskensis</u> (Roh.) Yellowheaded spruce sawfly	wS	Burgeo Rd.	0.3	1
<u>Pikonema dimmockii</u> (Cress.) Greenheaded spruce sawfly	wS	Pasadena Field Stn.	10.0	1
<u>Podabrus</u> sp. A soldier beetle	bF	River of Ponds, Bottom Brk. Rd.	0.8	2
<u>Pontania</u> sp. A willow sawfly	W	Buchans Rd., Mary March Prov. Park	6.0	2
<u>Pristiphora geniculata</u> (Htg.) Mountain ash sawfly	aMo	South Brook Valley, Lethbridge, Districts 104, 105 & 106	36.7	9
<u>Pristiphora lena</u> Kinc. Little spruce sawfly	wS	Bottle Pond Rd.	3.0	1
<u>Pseudexentera oregonana</u> Wlshm. Early aspen leaf curler	tA	Districts 104, 106 & 109	14.6	22
<u>Pulicalvaria piceaella</u> (Kft.) Spruce leafminer	wS	Grand Lake Brk.	0.3	1
<u>Sciaphila duplex</u> Wlshm. Poplar leafroller	tA	T.N.N. Park; Rattling Brook	1.8	2

Cont'd ...

OTHER NOTEWORTHY INSECTS (Concluded)

Species	Host(s)	Locality	Average per tree	No. of Collections
<u>Smerinthus jamaicensis</u> (Drury) Twin spotted sphinx	bS	8.0 km E. Port Blandford	2.0	1
<u>Sphinx gordius</u> Gram. Apple sphinx	bS	8.0 km E. Port Blandford	2.0	1
<u>Syneta</u> sp. A leaf beetle	bF	River of Ponds, Parson's Pond, Hawkes Bay, St. Patricks	1.5	4
<u>Syngrapha alias</u> (Ottol.) Spruce climbing cutworm	bF	Nickys Nose Cove, Rocky Brk., Wild Cove Pond Rd., Grand Lake Brk.	0.2	4
<u>Zeiraphera canadensis</u> Mut. & Free Spruce bud moth	wS	Cook's Brk., Pasadena Nursery, Middleton Lake, Glenwood Prov. Park, 2.0 km N. Sally's Cove	3.6	5
<u>Zeiraphera fortunana</u> Kft. Yellow spruce budworm	wS	2.0 km N. Sally's Cove, Bakers Brk., Cook's Brk., Pasadena Nursery, Southwest Gander River	3.3	5
<u>Zeiraphera improbana</u> (Wlk.) Larch needleworm	tL	Star Lake Rd., Jct. TCH and Stag Lake Prov. Park	50.2	2

IMPORTANT FOREST DISEASES

Scleroderris Canker of Pines - Gremmeniella abietina (Lagerb.) Morelet — Ornamental trees of red, Scots and black Austrian pines, measuring 3-8 m and showing symptoms of the disease, were found at six more locations in and around St. John's, Mount Pearl and Goulds on the Avalon Peninsula in 1980. The incidence of the disease varied from low to high, affecting 5% to 80% of the trees and 3% to 45% of the shoots. It caused up to 50% shoot mortality and up to 30% tree mortality.

Special surveys in natural stands of red and eastern white pine and plantations of many introduced pines on the Island have so far failed to show the presence of the disease.

Morphological characteristics, including symptoms, indicate that the pathogen may be the virulent European race of the fungus. However, confirmation will be made through the study of cultural and serologic characteristics.

Control of Scleroderris canker was attempted through pruning of infected branches and removal of severely infected trees in home gardens and other landscape areas where the infected trees were found.

Armillaria Root Rot - Armillaria mellea (Vahl. ex Fr.) Kummer — Armillaria root rot continued to be a major disease problem in softwood plantations. It was observed in a few more plantations than in 1979 and in several insect-damaged stands of balsam fir and black spruce near Crabbes River, on the Port au Port Peninsula, along Baie Verte Road, near Grand Falls and Gander and Red Indian Lakes on the Island. The disease affected as many as 15% of the trees and caused up to 5% tree mortality. This disease was also observed in patches in several mixed, mature and overmature black spruce stands in Mud Lake area, near Happy Valley and along Northwest River Road in eastern Labrador. The incidence of the disease was low; up to 10% of the spruce trees were infected in forested areas totalling about 3 000 ha. The fungus was also inhabiting several old stumps of black spruce in these forests.

The disease is continuing its spread, particularly in cutover areas on the Island where new plantations are being established without stump removal or any site treatment, and in natural stands which are being predisposed by insect infestations. The profuse growth and branching of subterranean rhizomorphs in these sites indicate a highly active and spreading pathogen.

Weather Damage - High wind storms caused considerable stem, branch and top breakage of many softwood and hardwood trees in several areas in western and central Newfoundland. Some blowdown of predominantly balsam fir stands was evident over 182 000 ha but affected more than 50% of the stand volume on about 33 000 ha. The total volume of blowdown was estimated at 4 370 000 m³ and most of it occurred in balsam fir stands killed or very severely damaged by the spruce budworm.

Frost-induced shoot mortality of balsam fir and black spruce was common in central Newfoundland and in eastern Labrador. In central Newfoundland 20% of the new growth was damaged on 1 ha of roadside balsam fir regeneration near the west end of Red Indian Lake. In some areas near Happy Valley and along Churchill Falls Road in Labrador, up to 70% of the new shoots in black spruce regeneration were killed. Frost also damaged the foliage of several young broadleaved trees and shrubs in forests and urban areas of St. John's, Topsail, Newtown, Gander, Grand Falls, Pasadena and Corner Brook on the Island. Serviceberry, waxberry, black and white ash, American mountain-ash and maples were most common. Damage affected up to 35% of the foliage and 10% of the trees.

Damage caused by winter injury was unusually conspicuous in several wind-exposed forested areas throughout the Island. In western Newfoundland light damage occurred on 70% of balsam fir regeneration on the Trout Brook and Bottle Pond Roads and from Western Brook to River of Ponds. Approximately 30% of Scots pine foliage was affected at Pasadena. In eastern Newfoundland several exposed areas on the Avalon Peninsula and many ornamental trees in St. John's were affected, some as much as 40%.

Shoot and Leaf Blight of Trembling Aspen - *Venturia macularis* (Fr.) E. Muell & von Arx. — Low to moderate incidence of the disease was observed in many areas of central Newfoundland and eastern Labrador. It affected about 50% of the new shoots in young aspen regeneration along Churchill Falls Road in Labrador and 25% of the new shoots in several regenerating areas on the Island. Associated seedling mortality was also evident at several locations. On the Island, the disease was particularly conspicuous on burnt sites where aspen regeneration was common.

This pathogen as well as the one causing shoot and leaf blight of other poplar species have been observed on the Island for several years and have often caused concern. The disease may become more important in future because of the expanding poplar planting program on the Island.

Stem and Branch Canker of Lombardy Poplar - *Dothichiza populea* Sacc. & Briard — *Dothichiza* canker of lombardy poplar continued to cause tree and branch mortality in many urban areas across the Island. Several new

FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1980
NEWFOUNDLAND

■ Areas of eastern dwarf mistletoe infection

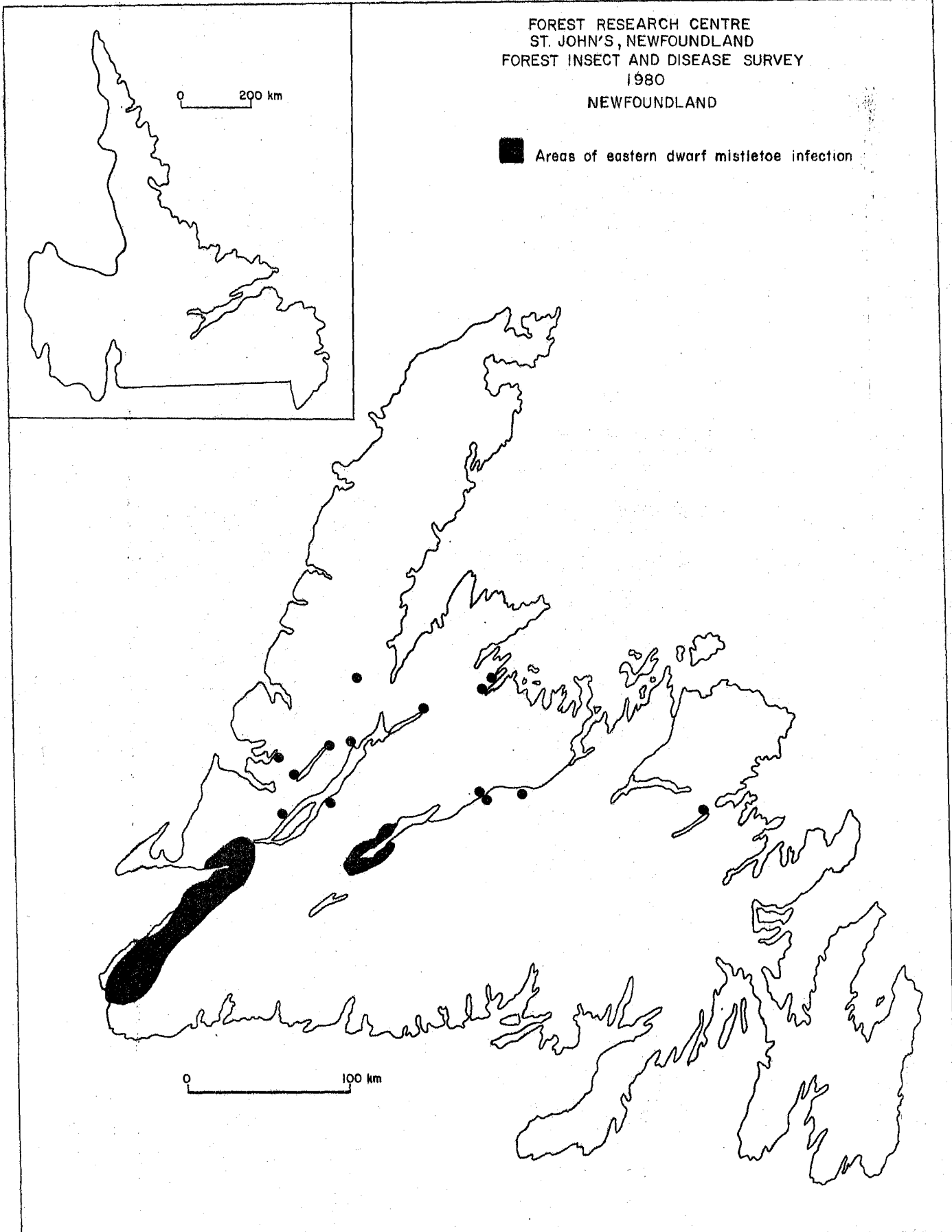


FIG. 10

Tip Blight of Balsam Fir - *Rehmiellopsis balsameae* Waterman — *Rehmiellopsis* tip blight of balsam fir was moderate to severe at a location near Grand Falls in central Newfoundland and in several scattered patches along Churchill Falls Road in eastern Labrador. It killed as many as 70% of the new shoots and affected up to 100% of the trees. The disease was confined mostly to the lower branches.

Taphrina Witches' Broom of Pin Cherry - *Taphrina cerasi* (Fckl.) Saded. — Witches' broom of pin cherry was unusually conspicuous and severe at several locations on the Avalon and Burin peninsulas, and in eastern Labrador. It affected up to 80% of the foliage of many cherry trees.

Needle Rusts of Conifers - *Pucciniastrum epilobii* Otth., *Chrysomyxa ledi* de Barry and *Chrysomyxa ledicola* Lagerh. — Needle rusts of balsam fir was less common than in 1979 and its incidence varied from trace to low, affecting up to 15% of the new foliage. However, needle rust of black spruce was unusually conspicuous in scattered patches in several young stands on the Avalon Peninsula, in some areas in central and western Newfoundland, and along Northwest River Road in eastern Labrador. It affected up to 90% of the current year's foliage on 80% of the trees.

Needle Casts of Conifers - *Lophodermium pinastri* (Schrad. ex Hook) Chev., *Lophodermium nitens* Darker and *Isthmiella faullii* (Darker) Darker — Needle casts of red and Scots pines were conspicuous in and around St. John's, Topsail and in several plantations on the Avalon Peninsula. They affected from 5 to 40% of the lower foliage. Needle cast of balsam fir was observed along Northwest River, Churchill Falls and Grand Lake roads in eastern Labrador, but its incidence was low.

Leaf Spots of Hardwoods - *Ciborinia whetzelii* (Seaver) Seaver and *Kabatiella apocrypta* (Ell. & Ev.) Arx — Several leaf spots were common on the Island and in eastern Labrador. The most conspicuous was the ink spot of trembling aspen. It was observed at several locations in eastern Labrador and its incidence varied from light to severe; affecting up to 70% of the trees and 60% of the foliage. Anthracnose of mountain and red maples was common in scattered patches in central and western Newfoundland although its incidence was low. Tar spots of willows were common in patches in several areas of eastern Labrador, affecting up to 75% of the foliage at some locations along Churchill Falls Road. Shot hole of pin cherry was common in central Newfoundland and eastern Labrador and affected from 20 to 80% of the foliage and up to 90% of the cherry trees at some locations.

Animal Damage - Red squirrel, Tamiasciurus hudsonicus, caused noticeable damage to the cones of red pine in natural stands at several locations near Sandy Lake in western and along Terra Nova Road and near Grants Siding in eastern Newfoundland and in black spruce stands near Happy Valley in eastern Labrador. On the Island up to 20% of the current years' cones were damaged. However, in Labrador, the damage was less; only up to 5% of the new cones were chewed.

OTHER NOTEWORTHY DISEASES

Organism and disease	Host(s)	Locality	Remarks
<u>Cronartium ribicola</u> J.C. Fischer White pine blister rust	Pine, eastern white	Gambo and Terra Nova National Park in central Newfoundland	Moderate to severe infection
<u>Gymnosporangium cornutum</u> Arth. ex Kern Leaf rust	Mountain-ash, American	In Baie Verte in western Newfoundland; and Northwest River Road in eastern Labrador	Trace
<u>Hypodermella laricis</u> v. Tub. Needle cast	Tamarack	Avalon & Bonavista peninsulas	About 10% of the foliage affected
<u>Nectria cinnabarina</u> Tode ex Fr. Dieback and coral spot or stem canker	Maple, sycamore, sugar	St. John's	Low, on ornamental trees

TREE PEST EXTENSION SERVICE

Forest Insect and Disease Survey technicians were responsible for providing technical information to federal, provincial, and municipal agencies, and the general public on the care and protection of forests, rural and urban, ornamental trees and shrubs. A total of 75 calls were received from citizens at the Forest Research Centre. From these calls 68 pamphlets and 5 letters were mailed and 12 visits were made to property owners. The Forest Research Centre also distributed 'Forestry Notes' of insect and disease pests to schools, trade schools and libraries to be used for teaching purposes. The Canada Department of Agriculture again provided updated pamphlets on garden and household pests.

The major pests recorded during 1980 were:

Spruce Budworm - Population levels increased in 1980 and severe defoliation to ornamental spruce and fir occurred in St. John's and surrounding areas. High numbers were reported in Mount Pearl, Paradise, and Wedgewood Park.

Birch Casebearer - Severe defoliation to birch trees occurred throughout the Avalon Peninsula particularly at St. John's, Seal Cove and New Harbour, Trinity Bay. Scattered ornamental birch trees were infested in the St. John's area as early as 1975.

European Pine Sawfly - This introduced pest, first discovered near Windsor Lake in 1974, continued to defoliate stands of pine at Windsor Lake and ornamental pines near Confederation Building in St. John's. Further releases of the larval parasite Lophyroplectus luteator (Thunb.) and the pupal parasite Phelophus basizonus (Grav.) were made at both sites. Another larval parasite, Exenterus abruptorius (Thunb.) was also released at Windsor Lake. This parasite was first released in 1946 near Corner Brook to control the European spruce sawfly but was never recovered.

Satin Moth - For the fourth consecutive year a severe infestation occurred on ornamental poplars and willows throughout the Avalon Peninsula. Complete defoliation of infested trees was reported from St. John's, Bauline Line, Torbay, Whitbourne and Dunville.

OTHER NOTEWORTHY INSECTS

Species	Host(s)	Locality
<u>Archips</u> spp. Leaf rollers	Maple	Harbour Grace
<u>Cryptorhynchus lapathi</u> (L.) Poplar and willow borer	Poplar	South Brook (Humber Dist.)
<u>Dermestes lardarius</u> L. Larder beetle	Household pest	St. John's
<u>Desmocerus palliatus</u> (Forst.) Elder borer	Golden elder	Mount Pearl, St. John's
<u>Gracillaria syringella</u> (F.) Lilac leafminer	Lilac	St. John's
<u>Harpiteryx xylostella</u> (Linn.) European honeysuckle Leaf roller	Honeysuckle	Mount Pearl
<u>Monochamus scutellatus</u> (Say) Whitespotted sawyer beetle	WS	Corner Brook
<u>Ocnerostoma strobiivora</u> Free. White pine needleminer	WP	St. John's
<u>Pristiphora geniculata</u> (Htg.) Mountain-ash sawfly	Mountain-ash	St. John's, Petty Harbour
<u>Rhyacionia buoliana</u> (Schiff.) European pine shoot moth	Mugho Pine	Corner Brook

DISEASES

Scleroderris Canker of Pines & Dothichiza Canker of Lombardy Poplar
were the most common extension service call for tree diseases.

Frost - Leaf damage to silver poplar, waxberry, black and white ash, American mountain-ash and maples was most likely caused by frost. Incidence of damage was from a trace to moderate, affecting up to 35% of the foliage and 10% of the trees/shrubs.

Winter Injury - Damage caused by winter injury was unusually conspicuous in several wind-exposed areas on the Avalon Peninsula and on many ornamental trees in St. John's. It affected jack, red and Scots pines.

OTHER NOTEWORTHY DISEASES

Species	Host(s)	Locality	Remarks
<u>Infectious diseases</u>			
<u>Apiosporina morbosa</u> (Schw.) Arx Black knot	Pin cherry	St. John's Bay Bulls	Trees were severely affect- ed in each area
<u>Lophodermium pinastri</u> (Schrad. ex Hook) Chev. Needle cast	Scots pine Red pine	St. John's, Topsail, St. John's	Generally low on both species
<u>Melampsorella</u> <u>caryophyllacearum</u> Schroet. Broom rust	Balsam fir	Bowring Park	Observed 5 brooms on one tree
<u>Nectria cinnabarina</u> Tode ex Fr. canker and dieback	Sugar maple	St. John's	Infection only occurred where branch was broken
<u>Taphrina populina</u> Fr. Leaf blister	Lombardy poplar	St. John's	30% of foliage affected on one tree
Dieback of Cedar	Eastern White Cedar	St. John's	Tree losing lower branches
Lichens & Molds	Red maple Sycamore maple Horse chestnut Pin cherry	St. John's	Common throughout the city on tree trunks
Roadside salt & snow injury	White birch	St. John's	Severely affected trees near streets. 90-100% defoliation

APPENDIX I

Appendix I. Results of spruce budworm egg-mass and overwintering larval surveys.

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
1	Witless Bay Line	3	0	Nil	Nil	-
2	Maddox Cove	3	0	L	Nil	-
3	Bay Bulls Big Pond	2	776	S	Nil	-
4	Kenmount Road	3	192	S	L	-
4A	Donovans	3	458	S	M	-
5	Paradise	2	620	S	S	-
5A	Windsor Lake	2	158	M	L	-
6	Blackhead	1	1,088	S	S	-
7	Logy Bay	3	347	S	M	-
8	Flatrock	3	701	S	S	-
9	Flatrock	2	90	S	L	-
10	Pouch Cove	2	71	Nil	L	-
11	Bauline	2	0	Nil	Nil	-
12	Indian Meal Line	2	33	L	L	-
13	Thorburn Lake	2	0	L	Nil	-
14	Logy Bay	3	291	S	L	-
15	Indian Meal Line	2	0	L	Nil	-
16	Paddy's Pond	2	153	S	L	-
16A	Paddy's Pond	3	530	S	M	-
17	Cochrane Pond	3	0	S	Nil	-
18	Foxtrap & T.C.H. Jct.	2	0	Nil	Nil	-
19	Butterpot Prov. Park	2	0	Nil	Nil	-
20	Holyrood	2	0	L	Nil	-
21	Holyrood road	2	0	Nil	Nil	-
22	Gushues Pond	2	0	Nil	Nil	-
23	Father Duffy's Well	2	0	Nil	Nil	-
27	St. Catherines	2	0	Nil	Nil	-
28	Makinsons Jct.	2	0	Nil	Nil	-
28A	N.E. Placentia	2	0	Nil	Nil	-
29	Long Harbour	2	0	Nil	Nil	-
30	Dunville	2	0	Nil	Nil	-
31	S.E. Placentia	2	0	L	Nil	-
32	Goose Pond	3	313	M	L	L
33	Dildo Arm	2	0	L	Nil	-
34	Whiteway	2	0	L	Nil	L
36	Long Point	2	0	M	Nil	-
37	Islington	2	0	Nil	Nil	-
39	Hearts Desire	3	535	M	M	-
40	Spread Eagle Peak	2	0	Nil	Nil	-
41	New Perlican	2	0	L	Nil	-

*Defoliation

L = Light = 0-25
M = Moderate = 26-75
S = Severe = 76-100

**Egg-mass category

L = Light
M = Moderate
S = Severe

*** Overwintering larval category

L = Low = 1-108
M = Medium = 109-323
H = High = 324+

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
43	Thornlea	2	0	Nil	Nil	-
44	Southern Cove Pond	2	160	M	L	L
45	Fox Harbour	2	0	Nil	Nil	-
46	Long Hr. & Placentia Rd. Jct.	2	0	Nil	Nil	-
47	N.E. Placentia	2	89	L	L	L
48	Jacks Pond	2	69	M	L	L
50	Hatchet Cove	2	0	L	Nil	-
51	St. Jones Within	1	342	M	S	-
52	Adeytown	2	96	S	L	L
53	Random Island	2	507	S	S	-
55	Deep Bight	1	523	S	S	-
56	Weybridge	3	250	S	L	L
57	Lady Cove	3	605	S	M	-
58	Clareville	3	230	S	L	L
59	Brittania	2	151	S	L	L
60	Barton	1	340	S	S	-
61	Waterville	1	413	S	S	-
62	Georges Brook	2	128	S	L	-
64	Lethbridge Farm Road	2	0	M	Nil	-
65	Winter Brook	1	493	S	S	-
66	Musgravetown	3	506	L	M	-
67	Portland	2	94	M	L	-
68	9.6 km E of Lethbridge	1	314	M	S	-
69	Sweet Bay	1	362	M	S	-
70	8.0 km E of Southern Bay Jct.	2	176	L	L	-
71	Summerville	2	0	M	Nil	-
72	Plate Cove West	3	410	S	M	-
73	Kings Cove	2	542	S	S	-
74	Stock Cove	3	478	S	M	-
75	4.5 km E of Stock Cove	2	721	S	S	-
76	Lockston Park	1	421	S	S	-
77	Port Rexton	2	0	Nil	Nil	-
78	Knights Cove	1	431	S	S	-
79	Upper Amherst Cove	2	0	M	Nil	L
80	Catalina	2	125	S	L	-
81	Champneys	2	0	Nil	Nil	-
83	Platters (T.N.N.P.)	3	0	M	Nil	-
84	Bread Cove (T.N.N.P.)	3	0	L	Nil	-
85	Dumpling Cove (T.N.N.P.)	3	80	L	L	-
86	Park Harbour Hill (T.N.N.P.)	2	603	L	S	-
87	Ochre Hill Road (T.N.N.P.)	3	168	M	L	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
88	Bread Cove Hills (T.N.N.P.)	3	0	L	Nil	-
92	Park Harbour Hill (T.N.N.P.)	3	34	L	L	-
94	South Broad Cove (T.N.N.P.)	3	220	L	L	-
96	Newman Sound (T.N.N.P.)	2	1,190	M	S	-
98	Saltons Brook (T.N.N.P.)	3	0	L	Nil	-
99	Southwest Arm (T.N.N.P.)	3	0	L	Nil	-
100	Bluehill Pond (T.N.N.P.)	3	17	M	L	-
101	Buckley Point (T.N.N.P.)	3	149	M	L	-
102	Swale Island (T.N.N.P.)	3	317	M	M	-
103	Newman Sound (T.N.N.P.)	3	0	M	Nil	-
104	North Broad Cove (T.N.N.P.)	3	26	L	L	-
112	North Pond	1	675	S	S	-
127	Thorburn Lake	2	0	L	Nil	-
128	Thorburn Lake	1	479	S	S	-
129	Port Blandford	2	173	M	M	-
130	Port Blandford	2	39	S	L	-
131	Bunyans Cove	3	315	S	M	L
132	South Boundary (T.N.N.P.)	3	269	L	L	-
133	Terra Nova Village	2	0	S	Nil	-
134	Cobblers Brook (T.N.N.P.)	3	0	L	Nil	-
135	Clode Sound (T.N.N.P.)	2	547	M	S	-
136	Charlottetown Jct. (T.N.N.P.)	2	189	L	L	-
138	3 km N of Charlottetown Jct. (T.N.N.P.)	1	375	M	S	-
139	Terra Nova Road	2	61	S	L	-
140	Big Brook (T.N.N.P.)	3	135	L	L	-
141	Sandy Pond (T.N.N.P.)	3	75	M	L	-
143	Chain Pond	3	516	S	M	-
145	Northwest Pond	3	274	L	L	-
146	Terra Nova Road	3	569	S	M	-
147	Terra Nova Road	2	0	M	Nil	L
148	Terra Nova Road	2	669	S	S	-
149	Lake St. John	2	98	M	L	L
150	4.8 km S New Pond	1	500	S	S	-
151	Mollyguaieck Lake	2	229	M	M	-
152	Larry's Pond	2	0	L	Nil	-
153	Larry's Pond	1	4,116	S	S	-
154	Kepenkeck Lake	3	836	S	S	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
156	Deer Pond	2	61	S	L	-
157	Deer Pond	1	417	M	S	-
158	Newton Lake	1	333	M	S	-
160	Southwest Pond	3	302	M	L	-
161	Triton Brook	2	63	M	L	-
164	Deer Pond	1	526	S	S	-
165	Triton Brook	2	1,170	S	S	-
166	Triton Brook	3	720	S	S	-
167	Riverhead Brook	2	45	M	L	-
168	Deadwolf Pond	1	455	S	S	-
169	Gambo Pond	2	78	M	L	-
173	Gambo Pond	2	0	S	Nil	-
174	Gambo	2	0	S	Nil	-
1001	Admirals Cove	3	0	Nil	Nil	-
1002	LaManche Prov. Pk.	3	0	Nil	Nil	-
1018	Ocean Pond	2	79	L	L	L
1019	Ocean Pond	3	246	S	L	-
1020	Ocean Pond	1	533	S	S	-
1023	Trinity	1	625	S	S	-
1024	Plate Cove	2	0	L	Nil	-
1026	Catalina	2	59	S	L	-
1029	Knights Cove	1	587	S	S	-
1032	Winterbrook	2	0	M	Nil	-
1051	Georges Lake	3	271	S	L	-
1052	Bunyan's Cove	2	515	S	S	-
1053	Mollyquajack Lk.	3	243	L	L	-
1054	Saunders Pond	3	80	S	L	-
1055	Glovertown	2	0	S	Nil	-
1056	Gambo Pond	1	476	S	S	-
1069	Larrys Pond	1	362	S	S	-
1070	Lake St. John	1	390	S	S	-
Average per branch			118			

CENTRAL NEWFOUNDLAND

119	Conne River	2	0	M	Nil	-
120	6.4 km N Head Bay d'Espoir	1	880	S	S	-
121	Milltown	3	1,172	S	S	-
122	Head Bay d'Espoir	2	590	S	S	-
123	4.8 km N St. Veronicas	2	0	S	Nil	-
124	St. Joseph's Cove	2	74	S	L	-
125	Swanger Cove	2	501	S	S	-
176	Dark Cove	1	697	S	S	-
177	Lower Dark Cove	2	0	S	Nil	-
178	Square Pond	1	346	S	S	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
179	6.4 km E. of Benton Jct.	3	272	S	L	L
180	Benton Jct.	1	364	L	S	-
183	Soulis Pond	1	627	S	S	-
184	Home Pond	2	0	M	Nil	-
188	Joe Batt's Pond	3	346	S	M	-
189	Glenwood	2	0	S	Nil	-
190	Gander Lake	3	333	S	M	-
191	Gander Lake	3	548	S	M	-
196	Lewis Lake	2	0	Nil	Nil	-
197	N.W. Gander River	3	725	S	S	-
200	Hunt's Brook	2	149	S	M	-
201	S.W. Gander River	3	475	S	M	-
202	Dead Wolf Brook	1	347	S	S	-
203	Caribou Lake	3	809	S	S	-
205	Lamottes Lake	2	0	M	Nil	-
208	N.W. Gander River	1	158	M	M	-
209	N.W. Gander River	3	344	S	M	-
210	S.W. Gander River	2	0	L	Nil	-
211	Great Gull River	2	0	M	Nil	-
213	N.W. Gander River	2	0	Nil	Nil	-
215	5.0 km N. Rattling Pond	2	125	S	L	-
219	8.0 km N. Crowe Lake	2	0	L	Nil	-
220	Burnt Lake	1	389	S	S	-
221	Burnt Lake	1	389	S	S	-
223	Tote Hill	3	726	S	S	-
224	Bay d'Espoir Rd.	3	426	S	M	-
225	Miquel's Lake	2	509	S	S	-
226	Bay d'Espoir Rd.	2	0	L	Nil	-
227	Bay d'Espoir Rd.	2	0	M	Nil	-
229	Little Gull Lake	2	169	M	L	L
230	Bay d'Espoir Rd.	2	576	S	S	-
232	Bay d'Espoir Rd.	2	1,494	S	S	-
233	Twillick Brook	1	1,147	S	S	-
234	Great Rattling Brook	3	686	S	S	L
236	North Great Rattling Brook	1	353	S	S	-
237	Great Rattling Brook	2	0	S	Nil	-
239	Great Rattling Brook	2	0	S	Nil	L
240	Diversion Lake	2	0	M	Nil	-
241	Sandy Brook	2	0	M	Nil	-
242	Diversion Lake	2	100	M	L	L
245	West Lake	2	0	M	Nil	L

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
247	10 km W. Grand Falls	2	0	S	Nil	-
248	Aspen Brook	3	598	S	M	-
249	Jonathan's Pond Prov. Park	3	542	S	M	-
250	Island Pond Brook	2	26	S	L	L
251	Weirs Brook	2	134	S	L	L
253	Gander Bay Rd.	2	136	S	L	L
254	Weirs Pond	3	207	S	L	-
255	Gander Bay	2	0	M	Nil	-
256	Beaver Hill	2	0	S	Nil	L
257	Carmanville	2	23	M	L	-
258	Bagged Hr. River	2	0	S	Nil	-
259	Dog Bay	3	333	M	M	-
260	Boyd's Cove	2	0	M	Nil	L
261	Chapel Island	2	0	M	Nil	-
262	Summerford	3	62	S	L	L
263	Chanceport	2	0	M	Nil	-
264	8.0 km N. Birchy Bay	2	0	M	Nil	-
265	Birchy Bay	2	0	M	Nil	-
266	Duder Lake	2	0	L	Nil	-
267	Burnt Lake	3	208	S	L	L
268	Burnt Lake	2	0	M	Nil	-
269	Bellman's Pond	2	0	M	Nil	-
270	Ten Mile Lake	3	314	S	M	-
271	Long Pond	2	136	S	L	L
272	South Pond	2	0	S	Nil	-
273	4 km S. Brinks Pond	2	98	S	L	L
275	Salmon Pond	2	90	S	L	-
276	Salmon Pond	2	0	S	Nil	-
277	Indian Pond	2	83	M	L	L
278	4.8 km N. Southside	2	0	S	Nil	-
279	Campbellton	2	0	L	Nil	-
280	Newstead Rd.	2	0	M	Nil	-
281	Burnt Lake	1	802	M	S	-
283	Jumpers Brook	2	0	S	Nil	-
284	Norris Arm	2	167	L	L	-
285	Norris Arm N. Jct.	1	363	M	S	-
286	12.8 km S. Lewisporte	1	375	M	S	-
287	8.0 km S. Lewisporte	3	662	M	S	-
288	Norris Arm North	2	0	Nil	Nil	-
289	Brown's Arm	2	133	L	L	L
290	Laurenceton	2	0	L	Nil	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category**
291	Point of Bay	3	214	L	L	L
292	Indian Cove	2	0	M	Nil	-
293	9.6 km S. Cottrell's Co.	2	0	M	Nil	-
295	6 km N. Northern Arm	2	60	L	L	L
296	Mill Pond	2	0	L	Nil	-
297	West Arm Brook	2	0	L	Nil	-
298	Pt. Leamington	2	0	M	Nil	-
300	New Bay Pond	2	0	M	Nil	-
302	new Bay Pond	2	0	S	Nil	L
303	New Bay Pond	1	389	S	S	-
304	New Bay Pond	2	0	M	Nil	L
306	9.6 km S. New Bay Pond	2	0	Nil	Nil	-
307	Hodges Hill	2	0	Nil	Nil	-
309	Moose Pond	2	34	L	L	L
312	Mary Ann Lake	2	152	S	L	-
314	Frozen Ocean Lake	2	0	L	Nil	-
316	Frozen Ocean Lake	2	0	M	Nil	L
317	South Twin Lake	2	105	L	L	L
318	South Twin Lake	1	1,000	L	S	-
319	Seal Bay Brook	2	500	S	S	-
320	4.8 km S. Wild Bight	2	0	Nil	Nil	-
322	4.8 km S.W. Wild Bight	2	0	L	Nil	-
323	Mark's Lake	2	743	S	S	-
325	North Twin Lake	2	105	S	L	L
328	North Twin Lake	2	0	Nil	Nil	-
329	North Twin Lake	2	0	Nil	Nil	-
330	Sop's Lake	2	0	L	Nil	-
331	Kippen's Pond	2	0	L	Nil	-
332	Roberts Arm Rd.	2	123	S	L	L
333	Crescent Lake	2	52	M	L	-
340	6.4 km S. Badger	2	2,308	L	S	-
342	Millertown Jct. Rd.	2	0	L	Nil	-
343	Millertown Jct. Rd.	2	0	S	Nil	-
345	Little Red Indian Pond	2	0	S	Nil	-
346	Buchans Rd.	2	0	M	Nil	L
348	Badger Lookout	2	0	M	Nil	-
349	Pamehac Brook	2	85	S	L	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category**
350	6.4 km W. West Lake	2	0	L	Nil	-
351	West Lake	2	0	L	Nil	-
352	West Brook	1	0	L	Nil	-
353	Sandy Lake	1	345	M	S	-
354	Sandy Lake	2	671	S	S	-
355	Sandy Lake	2	720	S	S	-
356	Caledonia Bk. area	2	0	L	Nil	-
357	Tom Joe's Bk.	2	0	Nil	Nil	-
359	Noel Paul's Bk.	2	0	S	Nil	L
360	Noel Paul's Bk.	3	335	M	M	-
361	Noel Paul's Bk.	2	110	S	L	L
362	Noel Paul's Bk.	1	352	L	S	-
365	Noel Paul's Bk. area	1	423	S	S	-
366	Noel Paul's Bk.	3	763	M	S	-
367	Noel Paul's Bk.	2	0	Nil	Nil	-
368	Tally Pond	2	45	S	L	L
369	Tally Pond	3	774	M	S	-
370	9.6 km N.E. Tally Pond	2	204	S	L	L
373	11.2 km N. Tally Pond	2	0	Nil	Nil	-
374	Harpoon Bk.	2	51	Nil	L	L
375	Buchans Jct.	3	0	M	Nil	-
377	Exploits Dam	2	67	L	L	-
378	Hungry Hill	2	0	M	Nil	-
379	Harpoon Bk. area	2	0	M	Nil	-
381	Harpoon Hill	1	355	S	S	-
383	Lake Douglas	2	0	M	Nil	-
384	Lake Douglas	2	0	M	Nil	-
385	Lake Douglas	2	0	M	Nil	-
386	Wilding Lake	2	0	M	Nil	-
388	Victoria River	2	0	Nil	Nil	-
393	Victoria River	2	0	Nil	Nil	-
394	Bobby's Pond	2	0	Nil	Nil	-
395	Red Indian Lake	2	0	M	Nil	-
396	Red Indian Lake	2	0	M	Nil	-
397	Red Indian Lake	2	0	M	Nil	-
398	Red Indian Lake	2	0	M	Nil	-
399	Red Indian Lake	2	0	M	Nil	-
400	Red Indian Lake	2	0	M	Nil	-
401	Red Indian Lake	2	0	M	Nil	-
402	Victoria River	2	0	Nil	Nil	-
403	Costigan Lake	2	0	Nil	Nil	-
406	Red Indian Lake	2	0	M	Nil	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category**
407	Shanadithit Bk.	2	63	M	L	-
413	Lloyd's Lake area	2	0	Nil	Nil	-
415	Lloyd's Lake	2	0	Nil	Nil	-
416	Lloyd's Lake area	2	0	L	Nil	-
417	Portage Lake	2	0	Nil	Nil	-
452	Buchan's Rd.	1	449	S	S	-
453	Buchan's Rd.	2	0	M	Nil	-
454	Badger Bk.	3	51	L	Nil	-
455	Joe's Lake	1	308	S	S	-
456	Crooked Bog	2	0	S	Nil	-
460	South Bk. (Halls Bay)	2	0	Nil	Nil	-
462	Three Corner Pond	2	0	Nil	Nil	-
465	Burnt Pond	2	0	M	Nil	-
467	South Bk. (Halls Bay)	2	0	M	Nil	-
468	Rocky Pond	2	0	L	Nil	-
469	South Pond	2	0	L	Nil	-
470	Barney's Bk.	2	56	L	L	-
471	Barney's Bk.	2	0	M	Nil	-
472	West Bk.	2	0	L	Nil	-
473	West Bk.	2	0	M	Nil	-
474	Burnt Berry Bk.	2	0	Nil	Nil	L
475	Burnt Berry Bk.	2	0	Nil	Nil	L
476	West Pond	2	709	S	S	-
481	Springdale	2	0	S	Nil	-
483	Davis Pond	2	0	L	Nil	L
484	King's Point Rd.	2	67	M	L	L
485	11.2 km E. Baie Verte Jct.	3	100	L	L	-
486	Indian River area	2	0	Nil	Nil	-
489	Jackson's Cove Rd.	2	0	S	Nil	L
490	Jackson's Cove Rd.	3	535	S	M	-
497A	King's Point	2	0	Nil	Nil	-
860	Rodney Pond	2	0	L	Nil	-
861	Southwest Gander River	2	213	S	M	-
866	Indian Bay Pond	2	49	L	L	-
867	Jonathan's Pond	2	0	S	Nil	-
868	Barry's Pond	2	0	Nil	Nil	-
870	Middleton Lake	2	0	Nil	Nil	-
874	Little Red Indian Pond	2	0	M	Nil	-
878	Lake Bond	2	0	Nil	Nil	-
880	Nutmeg Hill	2	0	L	Nil	-
881	Rocky Pond	2	40	S	L	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
883	West Brook	2	0	Nil	Nil	-
1015	Summerford	2	163		L	L
1025	Long Pond	2	543	S	S	-
1027	Long Pond	3	501	S	M	-
1028	Holywater Pond	2	0	Nil	Nil	-
1030	Fairbank	2	27	S	L	L
1031	Bridgeport	2	0	M	Nil	L
1033	Partridgeberry Hills	2	0	Nil	Nil	-
1034	Coy Pond	3	657	S	M	-
1035	Northwest Gander	2	0	Nil	Nil	-
1038	Bay d'Espoir	3	151	L	L	-
1039	Conne River	2	0	L	Nil	-
1040	Bay d'Espoir area	2	0	M	Nil	-
1041	Conne River	2	1,552	S	S	-
1042	9.6 km N.E. Head					
	Bay d'Espoir	1	350	S	S	-
1044	6.4 km N. St. Veronica's	2	0	Nil	Nil	-
1045	3.2 km S.W. St. Josephs					
	Cove	2	0	S	Nil	-
1046	Morrisville	2	96	Nil	L	-
1047	3.2 km E. Milltown	2	658	S	S	-
1048	6.4 km E. Milltown	3	739	S	S	-
1049	4.8 km E. Conne River	3	749	S	S	-
1058	Hare Bay	2	0	Nil	Nil	-
1059	Middle Brook	2	526	L	S	-
1060	Gull Pond	2	0	M	Nil	-
1061	Gander Lake	2	0	L	Nil	-
1062	Gander	3	751	S	S	-
1063	Gander Lake	3	243	L	L	-
1067	Hunt's Pond	1	400	S	S	-
1073	S.W. Gander River	2	0	L	Nil	-
1076	Gander Lake	2	0	M	Nil	-
1077	Glenwood	3	0	Nil	Nil	-
1078	Lewis Pond	2	44	Nil	L	-
1079	Jumpers Brook	2	0	L	Nil	-
1081	Great Rattling Brook	2	0	S	Nil	-
1082	Third Burnt Hill Pond	2	503	S	S	-
1083	6.4 km N.W. Conne Pond	1	1,364	S	S	-
1086	Conne River	2	1,722	S	S	-
1087	Home Pond	2	0	S	Nil	-
1088	Clarke's Head	2	0	L	Nil	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category*
1089	Clarke's Head	2	0	M	Nil	L
1090	Gander Lake	2	0	S	Nil	-
1091	Glenwood	2	0	Nil	Nil	-
1092	Templeman's Lake	2	0	L	Nil	-
1093	Rattling Pond	2	0	L	Nil	-
1094	Browns Arm	3	167	L	L	-
1095	9.6 km N. Point of Bay	2	0	L	Nil	-
1096	New Bay Road	2	0	Nil	Nil	-
1097	Hodges Hill	3	290	S	L	-
1098	South Twin Lakes	2	25	L	L	L
1099	South Twin Lakes	2	50	S	L	L
1100	Kippens Pond	2	0	Nil	Nil	-
1101	Crescent Lake	3	258	M	L	L
1103	Noel Paul area	2	833	S	S	-
1104	W. of Noel Paul Brook	2	33	Nil	L	L
1106	E. of Harpoon Hill	3	430	S	M	L
1107	Rogerson's Lake	2	323	S	M	-
1108	W. of Wilding Lake	2	0	Nil	Nil	-
1109	Tulk's Brook	2	0	Nil	Nil	-
1111	Lloyd's River	2	0	Nil	Nil	-
1124	Crooked Lake	2	0	M	Nil	L
1125	Badger	2	0	Nil	Nil	-
1127	Rocky Brook	2	0	L	Nil	-
1128	Powderhorn Lake	2	0	L	Nil	-
1131	Rocky Pond	2	0	L	Nil	-
1132	Little Joe Glodes Pond	2	0	Nil	Nil	-
1133	Misery Hill	2	0	Nil	Nil	-
1134	S. of Three Corner Pond	2	0	M	Nil	-
1135	South Brook	2	0	L	Nil	-
1136	8 km S. South Pond	2	0	L	Nil	-
1137	9.6 km S.E. Gull Pond	2	0	Nil	Nil	L
1138	Davis Pond	2	137	M	L	L
1139	Gull Pond	2	0	Nil	Nil	-
1140	King's Point	2	42	S	L	-
1141	Middle Arm Ridge	2	31	S	L	-
1154	6.4 km S.W. Gull Pond	2	0	Nil	Nil	-
1155	Indian Pond	2	0	L	Nil	L
1156	Jct. Baie Verte Rd. & Tch.	2	0	L	Nil	L
1157	Burnt Berry Brook	2	0	Nil	Nil	-
1158	Sheffield Lake	2	0	Nil	Nil	-
Average per branch			85			

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category**
<u>WESTERN NEWFOUNDLAND</u>						
335	Jct. Woodstock Rd.	1	2,308	S	S	-
336	LaScie Rd.	2	0	L	Nil	-
337	Jct. Nipper's Hr. Rd.	2	125	M	L	-
418	Puddle Pond	2	0	Nil	Nil	-
419	52 km from TCH, S.W. Brk. Rd.	2	0	Nil	Nil	-
421	3.2 km W. Silver Pond	2	0	L	Nil	-
423	Little Barachois Bk. area	2	0	Nil	Nil	-
424	Southwest Bk.	2	0	L	Nil	-
425	Southwest Bk.	2	0	Nil	Nil	-
426	Little Grand Lake	2	0	Nil	Nil	-
427	Little Grand Lake area	2	0	Nil	Nil	-
428	Little Grand Lake	2	0	Nil	Nil	-
430	Glover Island	3	44	Nil	L	-
431	Glover Island	2	0	Nil	Nil	-
432	W. Side of Grand Lake	2	0	Nil	Nil	-
433	Corner Brook Lake	2	0	Nil	Nil	-
434	Corner Brook Lake	2	0	Nil	Nil	-
435	Corner Brook Lake	2	0	Nil	Nil	-
436	8.0 km S. Pinchgut Lake	2	0	Nil	Nil	-
437	Pinchgut Lake	2	0	Nil	Nil	-
438	Pinchgut Lake	2	0	Nil	Nil	-
439	Stag Lake	2	0	L	Nil	-
441	Lady Slipper Rd.	2	0	Nil	Nil	-
442	Lady Slipper Rd.	2	163	L	L	-
444	South Brk. Valley	2	0	Nil	Nil	-
445	Northern Hr. Rd.	2	0	Nil	Nil	-
446	South Bk. Valley Rd.	2	0	Nil	Nil	-
448	Grand Lake	1	396	M	S	-
449	South Bk. Valley Rd.	2	25	Nil	L	-
450	Irishtown	3	224	Nil	L	-
451	Summerside	2	0	Nil	Nil	L
493	Cross Country Pond	2	109	S	L	-
494	Burlington Rd.	1	508	S	S	-
495	8.0 km N.W. Burlington	3	388	S	M	-
496	Burlington Rd.	3	561	S	M	-
497	South Bk. (Baie Verte Pen.)	2	0	S	Nil	-
498	South West Bk. (Baie Verte)	3	477	S	M	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category**
500	Ming's Bight Jct.	1	444	M	L	-
501	Jct. Ming's Bight	2	0	M	Nil	-
502	Ming's Bight Rd.	2	33	M	L	-
503	4.8 km E. Baie Verte	3	461	L	M	-
504	LaScie Rd.	1	381	L	S	-
505	Baie Verte Rd.	2	603	S	S	-
506	Jct. Seal Cove Rd.	2	19	L	L	-
507	6.4 km N. Baie Verte	1	389	S	S	-
509	Wild Cove Rd.	3	185	S	L	-
510	Jct. Wild Cove Rd.	3	950	L	S	-
511	Seal Cove	3	56	L	L	-
512	Southern Pond	2	27	L	L	-
513	Baie Verte Rd.	1	333	S	S	-
514	Gull Pond	2	208	M	L	-
515	East Pond	2	0	L	Nil	-
516	Westport	2	0	L	L	L
517	Pumbly Cove	2	0	Nil	Nil	-
518	Wild Cove Pond	2	0	Nil	Nil	-
519	4.8 km S.W. Gull Pond	2	0	Nil	Nil	-
525	Black Lake	2	0	M	Nil	-
527	Baie Verte Prov. Park	2	0	L	Nil	-
528	4.8 km W. Baie Verte Jct.	2	47	S	L	L
532	Birchy Lake	2	0	M	Nil	-
533	Birchy Lake	2	0	Nil	Nil	-
534	Birchy Lake	3	0	Nil	Nil	-
536	Chain Lakes	2	0	Nil	Nil	L
538	Goose Brook	2	0	Nil	Nil	-
539	Hind's Bk.	2	0	Nil	Nil	-
540	Howley	2	42	Nil	L	-
541	Jct. Howley Rd. & T.C.H.	2	0	Nil	Nil	-
542	6.4 km E. of Howley	2	0	Nil	Nil	-
543	Sandy Lake	2	0	Nil	Nil	-
544	6.4 km E. Big Falls	2	0	Nil	Nil	-
545	Big Falls	2	0	Nil	Nil	-
547	Mary Ann Bk.	2	0	Nil	Nil	-
548	Crooked Feeder	2	0	Nil	Nil	-
549	Crooked Feeder	2	0	Nil	Nil	-
550	Junction Bk.	3	137	L	L	-
552	Cormack	2	0	Nil	Nil	-
553	1.6 km E. White River Rd.	2	0	Nil	Nil	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category**
554	Little Falls	2	0	Nil	Nil	-
555	6.4 km E. Adies Lake	2	0	Nil	Nil	-
556	Hampden Rd.	2	0	Nil	Nil	-
557	Hampden Rd.	2	0	Nil	Nil	-
559	Hampden Rd.	2	0	Nil	Nil	-
561	Sop's Arm Rd.	2	0	Nil	Nil	-
562	Sop's Arm Rd.	2	0	Nil	Nil	-
564	Sop's Arm Rd.	2	0	Nil	Nil	-
565	Birchy Basin	2	0	Nil	Nil	-
566	Birchy Basin	2	0	Nil	Nil	-
567	Taylors Bk.	2	0	Nil	Nil	-
572	Sop's Arm Rd.	2	0	Nil	Nil	-
574	Main River area	2	0	Nil	Nil	-
575	Main River	2	0	Nil	Nil	-
576	Sop's Arm	2	0	Nil	Nil	-
578	Jackson's Arm	2	0	Nil	Nil	-
579	Great Coney Arm	2	0	Nil	Nil	-
580	9.6 km N.W. Sop's Arm	2	0	Nil	Nil	-
581	Main River	2	0	Nil	Nil	-
582	Main River	2	0	Nil	Nil	-
583	St. Paul's Big Pond	2	0	Nil	Nil	-
585	Upper Humber area	2	0	Nil	Nil	-
586	Upper Humber	2	0	Nil	Nil	-
587	Upper Humber	2	0	Nil	Nil	-
588	Upper Humber	2	0	Nil	Nil	-
590	Adies Lake	2	31	Nil	L	-
591	Whites River	2	0	Nil	Nil	-
592	6.4 km W. Adies Lake	2	0	Nil	Nil	-
593	Bonne Bay Big Pond	2	0	Nil	Nil	-
594	Rocky Bk.	2	0	Nil	Nil	-
595	9.6 km N.W. Deer Lake	2	0	Nil	Nil	-
597	Goose Arm Rd.	2	0	Nil	Nil	L
599	Deer Lake	1	382	L	S	-
600	Little Harbour	3	125	Nil	L	-
601	Humber Canal	2	0	Nil	Nil	-
602	4.8 km N.W. Glide Lake	2	0	Nil	Nil	-
603	Grand Lake	2	522	M	S	-
605	Pynn's Bk. (9.6 km west)	2	0	L	Nil	-
606	Pynn's Bk.	2	679	S	S	-
607	Pynn's Bk.	2	17	Nil	L	-
609	Blue Gulch Pond	1	340	L	S	-
610	15.4 km S. Frenchman's Pd.	2	0	Nil	Nil	L

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
611	Frenchman's Pond	2	0	Nil	Nil	-
612	Old Man's Pond	2	0	Nil	Nil	-
613	Hughes Lake	2	0	L	Nil	-
614	Old Man's Pond	2	0	Nil	Nil	L
615	Deer Lake	2	0	S	Nil	-
616	Otter Bk.	2	0	Nil	Nil	-
618	Goose Arm	2	0	Nil	Nil	-
619	8.0 km N. Old Man's Pond	2	0	M	Nil	-
620	6.4 km S. North Lake	2	0	Nil	Nil	L
622	Goose Arm Rd.	2	0	Nil	Nil	-
623	Goose Arm Rd.	2	0	Nil	Nil	-
624	Goose Arm Rd.	2	48	L	L	-
626	Trout River	2	0	Nil	Nil	-
627	Trout River Pond	2	0	Nil	Nil	-
628	Governor's Pond	2	0	Nil	Nil	-
629	Bonne Bay Big Pond	2	0	Nil	Nil	-
630	Bonne Bay Little Pond	2	0	Nil	Nil	-
632	Lomond River	2	0	Nil	Nil	-
642	Bakers Bk. Pond (GMNP)	2	0	Nil	Nil	-
645	St. Paul's Inlet	2	0	Nil	Nil	-
646	St. Paul's Inlet	2	0	Nil	Nil	-
649	6.4 km E. Cow Head	2	0	Nil	Nil	-
650	9.6 km E. Belldown's Point	2	0	Nil	Nil	-
651	9.6 km N. Baie Verte	3	0	L	Nil	-
652	12.8 km N. Baie Verte	3	42	S	L	-
653	4.0 km S. Fleur de Lys	3	42	M	L	-
654	N. of Baie Verte	2	0	L	Nil	L
655	3.2 km S.W. Little Lobster Hr.	2	211	L	L	L
669	Cloud River	2	0	Nil	Nil	-
671	6.4 km E. Roddickton	2	0	Nil	Nil	-
672	6.4 km W. Conche	2	0	Nil	Nil	-
673	8.0 km N.E. Roddickton	2	0	Nil	Nil	-
674	Coles Pond	2	0	Nil	Nil	-
675	6.4 km N. Roddickton	2	0	Nil	Nil	-
676	Roddickton Rd.	2	0	Nil	Nil	-
677	Beaver Brook	2	0	Nil	Nil	-
678	Northwest Arm	2	0	Nil	Nil	-
681	8.0 km W. Boony Lake	2	0	Nil	Nil	-
682	Middle Gulch Bk.	2	0	Nil	Nil	-
684	Leg Pond	2	0	Nil	Nil	-
685	6.4 km N. Castors River	2	0	Nil	Nil	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
689	Western Brook Pond	2	0	Nil	Nil	-
690	8.0 km S. Western Brook Pond	2	0	Nil	Nil	-
691	Hawkes Bay Rd.	2	0	Nil	Nil	-
693	Hawkes Bay Logging Rd.	2	30	Nil	L	-
694	Eastern Blue Pond	2	0	Nil	Nil	-
696	River of Ponds	3	291	Nil	L	-
697	Hawkes Bay Logging Rd.	2	141	Nil	L	-
698	Western Blue Pond	2	0	Nil	Nil	-
701	9.6 km N. Bellburns	2	0	Nil	Nil	-
702	8.0 km N.E. Bellburns	2	0	L	Nil	-
706	Brians Pond	2	0	Nil	Nil	-
720	Benoit's Cove	2	83	Nil	L	-
721	Frenchman's Cove	2	0	Nil	Nil	-
722	Gillams	3	122	Nil	L	-
723	Gillams Bk.	2	124	S	L	-
724	McIvers	2	0	L	Nil	-
725	Frenchman's Pd.	2	0	Nil	Nil	-
726	3.2 km S. Cox's Cove	2	0	Nil	Nil	-
727	Old Woman Hd.	2	0	Nil	Nil	-
730	Serpentine Lake Rd.	2	0	Nil	Nil	-
732	Serpentine Lake Rd.	2	0	Nil	Nil	-
733	Serpentine Lake	2	0	Nil	Nil	-
738	Pinchgut Lake	2	0	Nil	Nil	-
743	George's Lake	2	0	Nil	Nil	-
744	George's Lake	2	0	Nil	Nil	-
748	Serpentine Lake	2	0	Nil	Nil	-
754	Spruce Bk.	2	0	Nil	Nil	-
755	George's Lake	2	0	L	Nil	L
756	Island Pond	2	129	Nil	L	-
757	Grand Lake Bk.	2	0	Nil	Nil	-
758	Moose Pond	2	0	Nil	Nil	-
759	Gallants	2	54	L	L	-
760	Gallants	2	0	Nil	Nil	-
764	N. of Stephenville	2	0	Nil	Nil	-
771	Fox Island River	3	591	M	M	-
772	Fox Island River	2	150	M	L	1
773	Romaines Bk.	2	0	M	Nil	-
776	Jack Burke Pond	2	0	Nil	Nil	-
777	Mistaken Pond	2	38	M	L	-
778	Trout Bk.	2	0	Nil	Nil	-
780	Hare Hill	2	0	L	Nil	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
781	Grand Lake Road	2	0	L	Nil	-
782	Bottom Bk.	2	0	Nil	Nil	-
783	Bottom Bk.	2	0	L	Nil	-
784	Bottom Bk.	2	0	Nil	Nil	-
785	Southwest Bk.	2	0	Nil	Nil	-
786	Southwest Bk.	2	0	Nil	Nil	-
787	Little Barachois Bk.	2	0	L	Nil	-
788	Little Barachois Bk.	2	0	L	Nil	-
791	Bottom Bk.	2	0	L	Nil	L
792	Southwest Bk.	2	0	L	Nil	-
793	Barachois Prov. Park	2	0	L	Nil	-
794	Barachois Prov. Park	2	0	M	Nil	-
795	Mattis Pt. Pond	2	393	M	S	-
797	Long Gull Pond	2	0	Nil	Nil	-
798	Blanche Bk.	2	0	L	Nil	L
799	Cold Bk.	1	496	S	S	-
800	4.8 km S. Point au Maul	3	1,181	M	S	-
801	Flat Bay Road	2	0	M	Nil	-
803	4.8 km N. Ship Cove	3	852	M	S	-
804	Harry's Bk. (Port au Port)	1	519	L	S	-
805	Victor's Bk.	2	535	S	S	-
806	6.4 km E. Mainland	3	265	S	L	-
807	Barachois Bk.	2	105	S	L	-
809	Flat Bay Rd.	2	0	Nil	Nil	-
810	Steel Mtn. Rd.	1	445	S	S	-
811	Steel Mtn. Rd.	3	349	S	M	-
812	Steel Mtn. Rd.	1	382	M	S	-
813	Flat Bay Bk.	3	113	M	L	L
814	Flat Bay Bk.	3	193	M	L	L
815	Middle Bk.	2	25	M	L	L
818	Fischell's River	2	0	L	Nil	L
819	Mount Howley	2	0	M	Nil	L
820	Fischell's River	2	19	L	L	L
821	6.4 km S.E. Fischell's (TCH)	3	308	S	L	L
822	Robinson's River	2	133	L	L	L
823	Robinson's River	2	311	L	M	L
824	Robinson's River	2	0	Nil	Nil	-
825	Robinson's River	2	0	Nil	Nil	-
826	Robinson's River	2	0	Nil	Nil	-
827	Barachois Bk.	2	0	Nil	Nil	-
828	Barachois Bk.	2	0	Nil	Nil	L
829	Camp 180 Rd. (Crabbes River)	2	0	L	Nil	-
830	Jeffery's	1	1,572	S	S	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
831	Jct. St. Fintan's Rd. & TCH	1	383	L	S	-
832	Crabbes River Rd.	2	0	Nil	Nil	-
833	Camp 180 Rd.	2	0	Nil	Nil	-
834	Crabbes River	2	0	Nil	Nil	-
835	Crabbes River	2	0	Nil	Nil	-
836	Crabbes River	2	111	Nil	L	-
837	6.4 km E. Codroy Pond	2	0	M	Nil	L
838	Highland River	2	59	Nil	L	-
840	1.6 km N.E. Codroy Pond	2	0	Nil	Nil	-
841	North Branch	2	0	Nil	Nil	L
842	Codroy Pond	2	32	Nil	L	-
843	4.8 km S.W. Codroy Pond	2	0	Nil	Nil	-
844	6.4 km N. Coal Bk.	2	0	Nil	Nil	-
845	South Branch	1	1,678	S	S	-
847	4.0 km S. Upper Ferry	1	1,250	S	S	-
848	Mummichog Prov. Park	1	422	S	S	-
849	4.0 km N. St. Andrews	1	545	S	S	-
873	Nipper's Hr. Rd.	2	33	M	L	-
885	8.0 km N. Cross Country Pond	2	0	S	Nil	-
887	Bear Cove	2	67	M	L	-
888	6.4 km S. Pumbley Cove	2	0	Nil	Nil	-
889	Big Chouse Bk.	2	0	Nil	Nil	-
890	George's Cove	2	0	Nil	Nil	-
892	Conical Hill	2	0	Nil	Nil	-
893	4.8 km S.W. Glide Lake	2	0	Nil	Nil	-
896	Hughes Brook	2	128	S	L	-
898	3.2 km N. Governor's Pond	2	0	Nil	Nil	-
900	Western Brook Hill (GMNP)	2	0	Nil	Nil	-
901	4.8 km N. St. Paul's Inlet (GMNP)	2	0	Nil	Nil	-
902	Parson's Pond	2	0	Nil	Nil	-
903	Western Brook Pond	2	0	Nil	Nil	-
904	8.0 km S.W. Western Brook Pond	2	0	Nil	Nil	-
906	8.0 km N. Parson's Pond	2	0	Nil	Nil	-
907	11.2 km N.E. Parson's Pond	2	0	Nil	Nil	-
908	North Brook (Gallants area)	2	0	L	Nil	-
909	South Branch River	2	240	Nil	L	-
1112	Silver Pond	2	0	Nil	Nil	-
1113	Bottle Lake	2	50	Nil	L	-

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category*
1114	Little Grand Lake	2	0	Nil	Nil	-
1115	Grand Lake	2	0	Nil	Nil	-
1116	Grand Lake	2	0	Nil	Nil	-
1118	Eastern Lake	2	0	Nil	Nil	L
1119	Steady Brook	2	0	Nil	Nil	L
1120	Steady Brook	2	0	Nil	Nil	-
1122	Grand Lake	2	0	Nil	Nil	L
1123	Island Pond	2	0	L	Nil	L
1142	Middle Arm	2	370	S	S	-
1143	Burlington	2	67	M	L	-
1146	East Brook (Baie Verte Pen.)	3	298	S	L	-
1147	11.2 km S. South Brook	2	156	L	L	-
1148	11.2 km S.E. Baie Verte	2	144	S	L	-
1149	Seal Cove	2	0	M	Nil	-
1151	Wild Cove Pond	3	0	Nil	Nil	-
1152	Black Lake	2	0	L	Nil	-
1153	Black Lake	2	0	M	Nil	-
1156A	Kitty's Brook	2	0	Nil	Nil	-
1160	Sheffield Lake Road	2	0	Nil	Nil	L
1162	Birchy Lake	2	0	Nil	Nil	-
1164	Chain Lakes Road	2	0	Nil	Nil	L
1165	Chain Lakes Road	2	0	Nil	Nil	-
1167	Kelvin Brook	2	0	Nil	Nil	-
1168	Howley Woods Road	2	0	Nil	Nil	-
1169	Sandy Lake	3	376	L	M	L
1170	Sandy Lake	2	0	Nil	Nil	-
1171	Lake Buck	2	0	Nil	Nil	-
1172	Upper Indian Pond	2	0	Nil	Nil	-
1173	Saltwater Pond	2	0	Nil	Nil	-
1174	Jackson's Arm	2	0	Nil	Nil	-
1175	8 km S.W. Hampden	2	0	Nil	Nil	-
1176	Adies Lake	2	0	Nil	Nil	-
1177	Adies Lake	2	0	Nil	Nil	-
1178	Bonne Bay Pond	2	80	Nil	L	-
1179	Grand Lake	1	664	M	S	-
1180	Glide Lake	3	558	S	M	-
1181	Glide Lake	2	492	S	S	L
1182	Nicholsville	2	0	Nil	Nil	L
1183	North Lake	2	0	Nil	Nil	-
1184	North Lake	2	0	Nil	Nil	-
1185	Trout River	2	0	Nil	Nil	L

Appendix I. - Continued

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category***
1186	Hughes Lake	2	0	Nil	Nil	L
1187	Hughes Lake	3	44	Nil	L	L
1188	S. of North Lake	2	0	Nil	Nil	L
1189	Roddickton Road	2	0	Nil	Nil	-
1190	Leg Pond	2	0	Nil	Nil	-
1192	Cloud River	2	0	Nil	Nil	-
1193	3.2 km N.E. Wild Cove	2	0	L	Nil	L
1194	Main Brook	2	0	Nil	Nil	-
1195	Main Brook	2	0	Nil	Nil	-
1196	Main Brook	2	0	Nil	Nil	-
1197	Main Brook	2	0	Nil	Nil	-
1198	6.4 km W. Second Salmon Pond	2	0	Nil	Nil	-
1199	Salmon River	2	0	Nil	Nil	-
1200	8 km N. Bonny Lake	2	0	Nil	Nil	-
1201	Ten Mile Lake	2	0	Nil	Nil	-
1202	Roddickton Road	2	0	Nil	Nil	-
1204	Round Pond	2	0	Nil	Nil	-
1205	Ten Mile Pond	2	0	Nil	Nil	-
1206	12.8 km N.E. Round Pond	2	0	Nil	Nil	-
1207	Round Pond	2	0	Nil	Nil	-
1208	Round Pond	2	0	Nil	Nil	-
1209	Ten Mile Pond	2	0	Nil	Nil	-
1210	Ten Mile Pond	2	0	Nil	Nil	-
1211	Ten Mile Pond	2	0	Nil	Nil	-
1212	Ten Mile Pond	2	0	Nil	Nil	-
1213	Ten Mile Pond	2	0	Nil	Nil	-
1214	Jct. Bottle Pond Rd. & TCH	2	0	Nil	Nil	-
1215	Whites Road	2	0	L	Nil	-
1216	Southwest Bk. Road	2	0	L	Nil	-
1217	Romaines River	3	614	M	M	-
1218	4.8 km S. Fox Island River	2	0	Nil	Nil	L
1220	N. Fox Island River	2	608	S	S	-
1225	Mainland	3	827	S	S	-
1227	4.8 km W. North Brook	2	139	M	L	L
1228	Ryan's Brook	2	81	M	L	L
1229	Coal Brook	2	110	M	L	M
1230	Codroy Valley	3	487	M	M	L
1231	O'Regan's	2	103	M	L	L
1232	Overfalls Brook	1	527	S	S	-
1233	3.2 km E. Doyles	3	625	M	M	-

Appendix I. - Concluded

Plot No.	Plot location	No. branches sampled	Cumulative totals (No. egg-masses per 10 m ² foliage)	1980 defoliation*	Egg-mass category**	Over-wintering larvae category**
1234	Tompkins	1	553	S	S	-
1235	St. Andrews	3	362	S	M	-
1236	Croque Rd.	2	0	Nil	Nil	L
1239	4.8 km N.E. Tom Roses Pond	2	0	M	Nil	L
1240	6.4 km E. Burnt Village	2	0	L	Nil	L
1327	Logging School Road	2	0	Nil	Nil	-
1350	1.6 km N.W. Stag Lake	2	0	Nil	Nil	-
Average per branch			48			