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Investigations of Reported Possible Pesticicide Damage to Birds and Fish in Gaspé Region, Quebec.

by

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ABSTRACT

Reports of insecticide poisoning of birds and fish resulting from a forest insect control operation employing Dimecron® at the dosage rate of 140 gm ai/acre (2 oz ai/acre) were investigated in an area near Gaspé Quebec. Populations of birds and aquatic bottom fauna were censused in treated and untreated areas. The area around Lac Bazire was searched for evidence of a recent fish kill. Samples of soil, foliage, water and birds were collected from treated areas and analized for insecticide residues. No evidence of insecticide damage to birds, fish or aquatic bottom fauna was found. Dimecron® residues persisted in samples of foliage soil and water 12 days after application. Breeding toads, *Bufo americanus* (Holbrook) abounded in Lac Bazire, the site of the reported fish kill.

INTRODUCTION

On May 26th, 1975, the Quebec Department of Lands and Forests carried out spruce budworm control operations in the Gaspé area of Quebec (Fig. 1) using Dimecron® at the dosage rate of 150 gm ai/ha (2 oz. ai/acre). Weather conditions at the time of the operations were favourable with a temperature of 11°C, winds of 4 kph (2.5 mph) and high humidity (light scattered fog patches).

On June 4th reports of bird mortality occurring on or about the time of the insect control operations were received. Investigations into these reports and subsequent ones concerning a fish kill were carried out on June 6th.

Spring weather conditions were somewhat delayed in this area in 1975. Snow patches still clung to hill sides and sheltered areas in the valleys. Deciduous tree foliage had not flushed at the time of the investigation (June 6th) but leaf bud breaking of some broadleaf shrubs growing in exposed areas along roadsides and trails had begun. The new growth buds on spruce and fir had not started to swell and budcaps remained firm. Very few insects were observed. A few early spring adult flies, bees and butterflies were observed in sunny sheltered areas but no black flies or mosquitoes were recorded. Birds were quite active and vocal.

METHODS

Bird populations were monitored at five locations within the treated area (Fig. 1, locations 1,2,3,4 and 5) and in two locations in untreated areas (Fig. 1, location 10 and Lac Bazire) by walking slowly along trails for a period of 30 minutes and recording all singing and sighted birds. Populations of stream bottom fauna were sampled taking

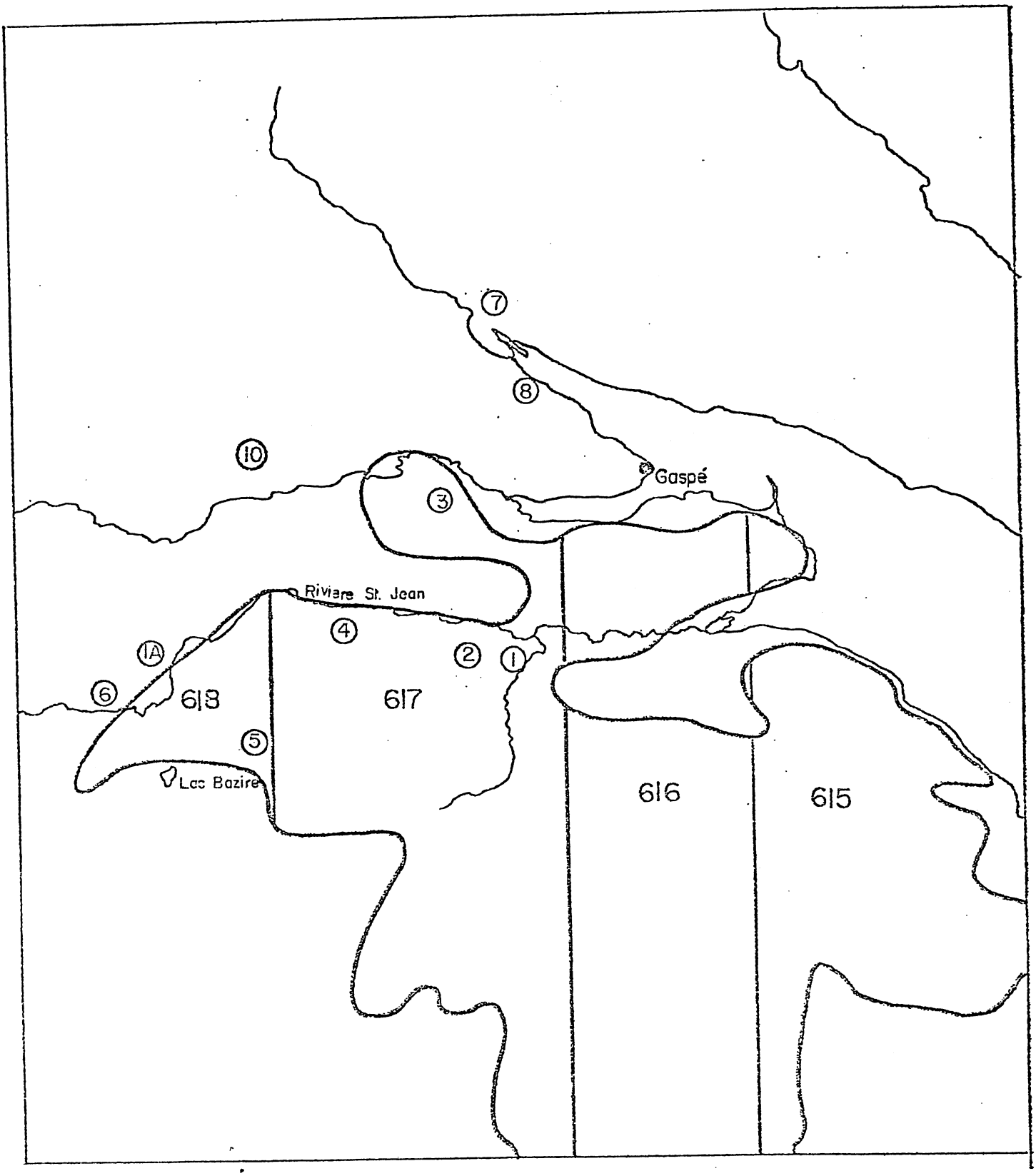

Fig. 1: Environmental sample points in Direcron® treatment area, Gaspé, Quebec, 1975. Treatment blocks 615, 616, 617 and 618 are shown.

five Surber samples from a stream in treated (Fig. 1, location 1) and untreated areas, (Fig. 1, location 1A).

Intensive searches of the shoreline and shallow areas of Lac Bazire were carried out for evidence of the reported fish kill. Samples of soil, water and balsam fir *Abies balsamea* (L.) mill. foliage were collected for chemical residue analysis. Samples of dead birds (all warblers) were collected at the site of a fish camp operation on the Rivière St. Jean just outside the treatment area (spray block 618) and frozen and returned to the laboratory for residue analysis.

RESULTS

Birds:- Some species of birds had set up breeding territories such as; the white-throated sparrow, *Zonotrichia albicollis* (Gmelin), the magnolia warbler, *Dendroica magnolia* (Wilson) and the Tennessee warbler, *Vermivora peregrina* (Wilson), while others such as ruby-crowned kinglets, *Regulus calendula* (Linnaeus), Myrtle warblers, *Dendroies coronata* (Linnaeus) and black-throated green warblers, *Dendroica virens* (Gmelin) were observed foraging in small flocks. The population census data taken on June 6th from treated and untreated areas does not indicate a reduction of bird fauna resulting from the budworm control program (Table I). The lateness of the spring undoubtedly delayed insect emergence and insectivorous species especially Myrtle warblers were observed foraging over lakes indicating that they were experiencing difficulty in acquiring food (as was observed in Quebec in 1974 when severe spring starvation mortality was observed).

Additional reports of bird mortality (Fig. 1, locations 7 and 8) were not investigated as all evidence (bird carcasses) had by then been discarded.

TABLE I

Small forest songbirds recorded in Dimecron® treated and untreated areas

Gaspé, Quebec

June 6, 1975

Species	Dimecron® treated blocks					Untreated areas	
	Observation location					Observation location	
	1	2	3	4	5	Camp 10 Rd.	Bazire L.
Yellow-bellied Sapsucker	1	1	1	-	-	-	-
Least Flycatcher	8	-	-	2	-	2	-
Eastern Wood Peewee	-	2	-	-	-	-	-
Olive-sided Flycatcher	-	-	-	2	-	2	-
Tree Swallow	-	-	-	2	-	-	-
Blue Jay	-	-	-	-	-	1	-
Black-capped Chickadee	2	3	-	-	-	-	-
Red-breasted Nuthatch	-	2	-	-	-	2	-
Winter Wren	2	2	-	2	-	-	2
American Robin	2	3	-	-	-	-	3
Hermit thrush	-	-	-	-	-	2	-
Golden-crowned Kinglet	-	2	-	-	-	-	2
Ruby-crowned Kinglet	-	-	8	2	-	6	-
Red-eyed Vireo	4	4	2	-	2	2	-
Black and White Warbler	2	-	-	2	-	-	-
Tennessee Warbler	2	-	4	2	4	10	-
Nashville Warbler	4	-	2	-	-	-	-
Parula Warbler	-	6	-	-	-	-	-
Magnolia Warbler	6	2	4	2	2	6	2
Cape May Warbler	-	-	-	-	-	4	2
Black-throated Blue Warbler	-	2	-	-	-	-	-
Myrtle Warbler	1	-	-	8	-	6	2
Black-throated Green Warbler	2	6	4	-	-	-	-
Blackburnian Warbler	-	-	2	-	-	-	-
Chestnut-sided Warbler	2	-	-	-	-	-	-
Bay-breasted Warbler	2	4	-	-	-	8	-
Blackpoll Warbler	-	-	-	4	-	-	-
Ovenbird	4	-	2	-	-	-	-
Northern Waterthrush	4	-	-	2	-	-	2
Canada Warbler	-	4	-	-	-	-	-
American Redstart	-	-	-	2	-	-	-
Brown-headed Cowbird	2	-	-	-	-	-	-
Red-breasted Grosbeak	2	-	-	-	-	-	-
Evening Grosbeak	-	-	1	-	-	-	-
Purple Finch	4	2	-	2	4	-	3
Pine Siskin	-	-	-	-	-	-	4
American Goldfinch	-	-	-	-	-	2	-
Chipping Sparrow	-	-	-	-	-	4	-
White-throated Sparrow	-	4	4	3	2	6	6
Unidentified Species	-	-	-	-	-	2	-
Totals:	56	47	34	37	14	65	28

TABLE II

Populations of aquatic bottom fauna collected in surber samples from Dimecron [R] treated and untreated streams

Gaspé area, Quebec

1975

Aquatic group	Treated stream					Untreated stream				
	Surber sample number					Surber sample number				
	1	2	3	4	Average and standard deviation	1	2	3	4	Average and standard deviation
Ephemeroptera	58	22	15	31	31.5 ± 18.8	11	1	11	12	8.8 ± 5.2
Plecoptera	2	2	5	3	3.0 ± 1.4	-	-	-	-	-
Lepidoptera	1	-	-	-	0.2 ± 0.5	-	-	-	-	-
Diptera-Chironomidae	4	3	6	3	4.0 ± 1.4	3	1	-	2	1.5 ± 1.3
-Simuliidae	-	-	-	1	0.2 ± 0.5	1	-	-	-	0.2 ± 0.5
-Rhagionidae	1	-	-	-	0.2 ± 0.5	-	-	-	-	-
Platyhelminthes	1	-	-	-	0.2 ± 0.5	-	-	-	-	-
Oligochaeta	-	-	-	-	-	2	-	1	-	0.8 ± 1.0
Mollusca-Gastropoda	-	-	-	-	-	-	-	1	-	0.2 ± 0.5
Total	67	27	26	38	39.5 ± 19.1	17	2	13	14	11.5 ± 6.6

TABLE III

Analysis of Dimecron® residues in samples of birds, soil, water and foliage obtained from the Gaspé area, Quebec.

June 9, 1975*

Sample and location	Mass	Dimecron® ppb**		
		Trans	Cis	Total
Treatment Block 617, 1 - Soil	558 g	68	66	134
Treatment Block 617, Balsam Fir Foliage	100 g	400	335	735
Treatment Block 617, 1 - Water (Chesney Creek)	710 ml	11	13	24
Treatment Block 617, 2 - Balsam Fir Foliage	100 g	195	178	373
Untreated Area (Fig. 1, 6) birds	32.3 g	98	115	213

* Analysis provided by Dr. K.M.S. Sundaram, Pesticide Chemist, C.C.R.I.

** ppb = parts per billion

Aquatic Organisms: - Examination of the data gathered from streams in the treated (Fig. 1, 1) and untreated areas (Fig. 1, 1A) does not indicate an impact of the insecticide upon the bottom fauna (Table II). Such organophosphate insecticide sensitive groups as May fly nymphs, Ephemeroptera and stonefly nymphs, Plecoptera, were present at normal population levels in the treated stream (Table II). Population of other groups were very low in both streams which reflects the lateness of the spring and the very cold water temperatures (5°C to 8°C).

Fish:- A report of a large fish kill in Lac Bazire just south of treatment block 618 was investigated. Shore line searches failed to provide any evidence of dead fish being washed ashore and there was also no evidence of fish carrion being eaten by bears (seen in the area) or gulls. A search of the shallow bays of the lake did not reveal any dead fish on the bottom. Large numbers of american toads, *Bufo americanus* (Holbrook) were observed breeding in the shallow waters of the lake and no mortality was observed.

Pesticide:- Dimecron® residues remained in samples of soil, foliage, water and bird samples 12 days after application (Table III). Levels of insecticide at this time probably represent an original deposit of about 140 gm ai/acre (2 oz ai/acre) in the sample areas (Sundaram pers. com.).

CONCLUSIONS

The late spring in this area of the Gaspé delayed insect activity probably causing a shortage of food for northward migrating insectivorous birds. This is further indicated by the peculiar situation observed of warblers (especially Myrtle warblers) feeding on emerging insects over lake surfaces. There would probably be fewer insects available for food on or about the day of the budworm control operation (May 26). Only warblers (in an advanced state of decomposition) were found in the bird sample obtained for residue analysis, and other areas of reported bird mortality were located well outside the treatment area. Seed feeding species such as the white-throated sparrow, *Z. albicollis* and purple finch, *Carpodacus purpureus* (Gmelin) were well established in breeding territories indicating no interruption had taken place to species able to forage on other food material besides insects.

The sampling of streams in treated and untreated areas produced very few specimens of bottom dwelling organisms which is probably due to the earliness of the spring and very cold water. Specimens of such insecticide sensitive species as mayfly and stonefly nymphs were collected from samples from both streams indicating that the insecticide application had not harmed stream bottom insect fauna. The absence of any evidence of dead fish in or around Lac Bazire coupled with the fact that the inshore shallows was teeming with breeding toads would indicate that the forest insect control program had not affected the lake.

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