REPORT ON THE SAMPLING AND IDENTIFICATION OF MOSQUITO LARVAE IN THE GREATER MONCTON AREA

(from May 7 to July 28, 1997)

Introduction

The goal of this report is to describe the distribution of different species of mosquitoes throughout Greater Moncton.

We know that there are 74 species of mosquitoes in Canada (Wood *et al.* 1979) but only a few of these species have been sampled in this region in the past years. Therefore, an approach whose aim is to maximize the number of species sampled is used for this study. This means that sampling was done in a number of different habitats to augment the chances of sampling a greater number of species.

The report includes explanations on sampling, preservation and identification of specimens. All of the work accomplished in this report was done with the mosquitoe larvae only. A list of the species sampled will be given, along with where and when they were sampled.

Sampling and preservation

In the past, it was believed that mosquitoes reproduced in tall grasses, based on the fact that many adults were encountered in such areas. But we now know that mosquitoes reproduce in still waters of all kinds. However, mosquito larvae are not found in lakes where waves may disturb the surface of the water, where the larvae breathe. Therefore, to sample the larvae, we must make our way into wet areas, where the water is stagnant (still waters).

Around Moncton, the marsh-type areas along the Petitcodiac River are excellent areas to sample mosquito larvae, as long as there is enough water accumulated. These marshes represent the largest area (among the sites in this report) that we can qualify as breeding areas for mosquitoes, even though other types of sites (forests and open areas ...) are also very good reproduction areas for many species of mosquitoes.

Technique

To proceed with sampling once arrived at the site, the larvae are located visually, quite easily (the larvae are almost always visible at the surface of the water while they are breathing). If it is impossible to spot them visually, an aquatic insect net is used to check the water for larvae. The sampling itself is done , when possible, with the aquatic insect net. If it is impossible to use the net (because of poor water depth or too much vegetation...) small jars are utilized for sampling. One of the advantages of using the net, is the fact that it permits us to estimate the quantity of water through which it was dragged (m^3). The net also allows us to concentrate samples in the event that there are few larvae in that particular sample.

After passing the net through the water

the larvae are transferred into a pan before being transferred a second time, into marked jars before being returned to the laboratory. During field work, a lot of information is noted. Temperature (°C), pH, water appearance, vegetation as well as dimensions of the pond are among this information. In order to insure a profitable day's field work, outings should be limited to days when it is not raining. Furthermore, we must make sure to disturb the surface of the water as little as possible before sampling the larvae. These two aspects must be considered for the same reason ; all movement at the surface of the water, either caused by rain or other movements, make the larvae descend to the bottom of the pond, rendering them impossible, or very difficult to sample.

Once back at the lab, the larvae are counted and larval densities may be calculated. After calculations, all larvae that are of sufficient size (usually those that are in the fourth instar), are preserved. The steps of preservation are described here (as described in Wood *et al.* 1979)

The larvae are immerged (live) in a KA_3A_{30} solution (100 mL kerosene, 300 mL acetic acid, 3000 mL ethanol) for a period of 15 minutes. The solution allows us to preserve the larvae in an erect position and all sturctures in good condition. When removing them from the first solution, they are washed in 95 % ethanol and are then placed in small marked jars containing 70 % ethanol. After this procedure, the larvae are ready to be identified.

Identification

The list of material will be given here, followed by the steps and the details involved in the identification.

Material

- « *The Insects and Arachnids of Canada, Part 6.* » (Wood *et al.* 1979)
- Dissecting microscope (with 20X eye pieces)
- Additionnal lamp (for sufficient lighting)
- Compound microscope
- Microscope slides
- Disposable Pasteur pipettes
- Pétri dishes
- Tweezers
- « Pic » (small pointy piece of metal)
- Small jars with lids
- Distilled water
- 70% ethanol
- Sand

Method

The method utilized to proceed with the identification may be split into two steps ; the preparation of the material and the actual identification. First, the bottom of the Petri dish must be covered with sand and water (with the water level being slightly above the level of the sand). Whenever possible, the larger sand particles must be removed . Sand is used in order to keep the larvae from moving around during manipulations. The Petri dish must contain enough water to keep the larvae continually hydrated, to avoid them being dried-up. More water is added when the level in the dish is diminished due to evaporation (the Petri dish is placed under strong lights). Finally , small jars containing 70 % must be kept close by to be able to place identified specimens in them , in order not to mix identified and non-identified larvae.

Once the instruments are ready, we may proceed with the identification. The work was accomplished with a dissecting microscope with 20X eye pieces, which allow us to have a final enlargement of 500X (25 x 20). A second lamp was used , because a single lamp provided insufficient lighting.

In order to take the larvae from their jars (marked with date, site, and sample number...) a pair of tweezers had to be used. To assure not to damage the specimen, the tweezers were placed under it, and it was gently lifted out of the jar. Sqeezing the specimen with the tweezers had to be avoided , not to risk it loosing its setae (hairs which are important for the identification process).

The larvae had to be placed in the Petri dish containing water and sand, and then the dish was placed under the dissecting microscope.

The identification of the mosquitoe larvae was done using the identification key found in « *The Insects and Arachids of Canada, Part 6 »* (Wood *et al.* 1979). First, the genus to which the individual belonged had to be established in order to then be able to identify the species. To

manipulate the specimen, a « pic » was used. The manipulations had to be done delicately, to avoid damaging the larvae.

Once identified, the specimen was placed in a different jar (with 70 % ethanol) and another individual could then be identified. Once all the desired larvae were identified in a particular sample, they were all placed in their original jar, and another sample was chosen to go through the same steps of identification.

To identify certain species, such as *Aedes stimulans* , it was necessary to place it under a compound microscope to look at certain structures. The compound microscope projected light through the specimen, which enabled us to see structures that were invisible with the dissecting microscope (the pecten teeth and the comb scale, for instance). We simply had to place the larvae on a slide (with a bit of water) and proceed with observation. It was often necessary to move the specimen in order to better view structures. Observations with the compound microscope were done at an enlargement of 150X (or more, *if necessary*).

Structures observed for identification

The identification of fourth instar larvae is principally done by looking at the setae. After many weeks of identification, we noticed that certain structures were more useful in the identification than others. Some of those structures are : the siphon, the pecten teeth, setae 1S, the saddle, tha anal papillae, setae 2X and 3X, the dorsolateral setae on the abdomen, the mesothoracic setae 1M, prothoracic setea 1P, 2P, 3P, 5P and 6P (mostly), head seta 5C (mostly), 6C and 7C, and finally the antenna.

***All of the lab work was done at the Université de Moncton, Moncton N. B.

Sampled species

During the study period, from May 7 to July 28 1997, a total of 16 species were sampled, preserved and identified. These species came from a total of 37 sites throughout Dieppe, Moncton and Riverview. The sites represented different habitats and therefore contained different species. Three categories of habitat present themselves ; marshes, forests and open areas (fields, bogs, ditches...).

Table I -- Qualification of sites

Marshes	**Forests**	**Open areas**
Dieppe		
Beaubassin	Parc St-Anselme	
DTDR (Ditch to dirt road)		
Jacques		
Lafayette		
Traffic Circle		
Moncton		
Maritime Products	Centennial Park 4	Glengrove Lagoon
Morton Ball Park	Centennial Park 6	Llangollen
Superstore	Irishtown Nature Park	Wendland
Whitefrost	Mapleton	
	McLaughlin (res.)	
	McNaughton	
	Morton (woods)	
Riverview		
Hawkes	Dobson Trail	Coverdale Rd.
Mill Creek		Findlay
New Point Park		Henderson
New Rocca		RHS (bog)
Point Park I		RHS (trails)
Point Park II		Turtle Creek Rd.
Point Park III		Whitepine (ext)
Rocca		
Weir		

Most of the sites were qualified as marshes. These marshes were mostly composed of cattails and *Carex spp.* (sedge). The ratios in the vegatation varied , obviously, from one site to the next.

Regarding the species sampled in the marshes, the following groups were found (genuses) :*Aedes*, *Culex* and *Culiseta*.

List of sampled species
(May 7 to July 28 1997)

Aedes abserratus	*Culex pipiens*
Aedes canadensis	*Culex territans*
Aedes cantator	
Aedes cinereus	*Culiseta minnesotae*
Aedes diantaeus	*Culiseta morsitans*
Aedes excrucians	
Aedes fitchii	*Wyeomia smithii*
Aedes provocans	
Aedes punctor	
Aedes sollicitans	
Aedes stimulans	

For the genus *Aedes*, the sites in the marsh category were inhabited by *Aedes cantator* and certain sites by *Aedes sollicitans* and *A. cantator* (DTDR, New Rocca , Point Park III and Rocca). According to the collected data, we are unable to see a link between temperature and the presence of these species, due to the fact that the water temperature varies with that of the air. (that is why temperatures recorded later in the season are higher, see Appendix. It is not only for

these marsh sites that no link with temperature was found, it is in fact the case for all sites, for the duration of the study period. For the marshes, recorded temperatures varied from 8 to 28 °C, with an average of 15 °C.

One of the only links found between the presence of these species and the sites in question, is the pH level. Most waters in the marshes were alkaline (47 / 83 = 57 %). Among the 36 samples that were acidic , the majority were close to 7 (6,5 or higher). A few had a pH level that was lower than 6,5. The pH level average was 6,8. The average is acidic, due to the fact that a small number of samples were *very* acidic (as low as 4,0), thereby lowering the average.

Other links between these sites was the fact that the dominating vegetation was composed of cattails and sedge (*Carex spp.*), in addition to the fact that most of the sites had very muddy bottoms. The exposition to sunlight does not appear to play a role in the presence of mosquito larvae in these areas. (They were sampled in well-exposed areas as well as in shady or covered ones.)

An interesting aspect to mention, is that among certain marsh type sites, some saw new species appear later in the summer.

At the Beabassin site, *Aedes cantator* was (sapled???) with *Culiseta minnesotae* (July 3 1997) ; at DTDR, *A. cantator* was present with *Culiseta morsitans* (June 13 1997). But the site where the most new species appeared was Rocca. By the end of July (22, 25 an 28th) the following species were sampled : *Culex pipiens, Culex territans, Culiseta minnesotae* and *Culiseta morsitans*. These four species were eiher sampled alone, all together or in association with *Aedes cantator*.

It is also within the marshes that the largest larval densities were calculated (compared to the other two types of habitat). Here are the larval densities for the three types of habitat :

Marshes = 65 902 / m^3

Forests = 1280 / m^3

Open areas = 575 / m^3

The average for the marshes may appear to be quite high, but it must be said that the sampling ponds in the marshes were often very small, thereby concentrating the number of larvae into a very small volume of water.

The other two types of habitat display a higher diversity of mosquito larvae, even though, as mentioned, they have lower larval densities. A total of 9 species (for open areas) and 10 (for forests) were sampled compared to 6 species for marshes.

Also, the species encountered weren't the same in the marshes as in the other types of habitat with the exception of rare individuals of marsh-type species that were sampled in ditches or fields. (But these ditches and fields were relatively close to the Peticodiac River, where most of the marshes were located.)

Table II -- Distribution of species according to type of habitat

Species	**Marshes**	**Forests**	**Open areas**
Aedes abserratus		X	X
Aedes canadensis		X	X
Aedes cantator	X		X(very few)
Aedes cinereus		X	X
Aedes diantaeus		X	
Aedes excrucians		X	X
Aedes fitchii		X	
Aedes provocans		X	X
Aedes punctor		X	X
Aedes sollicitans	X		
Aedes stimulans		X	X
Culex pipiens	X		

Culex territans	X		
Culiseta minnesotae	X		
Culiseta morsitans	X	X (few)	
Wyeomia smithii			X

One of the differences between the marshes and all other sites, is the fact that the bottom of the ponds in marshes was only muddy (it didn't have much debris such as wood or leaves...), while in the forests and open areas, the bottoms of thoses ponds were covered with much more debris, in addition to mud. The water was much clearer in the forests and open areas than in the marshes. Also, the exposition to sunlight was usually not as high in forests, as it was in the other areas. It is also noteworthy to mention that there doesn't appear to be any relation between the type of forest and any particular species.

We can see quite clearly, that the conditions in marshes favor the following species : *Aedes cantator, Aedes sollicitans, Culex pipiens, Culex territans, Culiseta minnesotae* and *Culiseta morsitans*. The two other types of habitats (forests and open areas) do not seem to favor one species over another, and the species from the marshes are not present at these locations (rare exceptions only). The only site that had only one unique species, was the bog near Riverview High School (RHS bog). At this location, there are many pitcher-plants present (*Sarracenia purpurea).* Water accumulates in the leaves of this carnivorous plant, and many insects enter the leaves and cannot get out, due to the hairs on the inside of the leaf that are oriented towards the bottom. Those insects are digested by the plant. Adults of the mosquitoe species *Wyeomia smithii* lay their eggs in these plants, and the larvae develop without any negative effects (they are not digested). Therefore, *W. smithii* larvae may be collected in such plants.

Table III --- Distribution of species in the genus *Aedes*
(May 7 to July 28 1997.)

Species / Sites	*Aedes abserratus*	*Aedes canadensis*	*Aedes cantator*	*Aedes cinereus*	*Aedes diantaeus*	*Aedes excrucians*	*Aedes fitchii*	*Aedes provocans*	*Aedes punctor*	*Aedes sollicitans*	*Aedes stimulans*
Dieppe	----------	----------	---------	----------	--------	----------	------	----------	--------	----------	----------
Beaubassin			X								
DTDR			X							X	
Jacques			X								
Lafayette			X								
Parc St-Anselme		X						X	X		
Traffic Circle			X								
Moncton	----------	----------	---------	----------	--------	----------	------	----------	--------	----------	----------
Centennial Park 4				X							
Centennial Park 6									X		X
Glengrove Lagoon						X					
Irishtown Nature Park	X	X				X			X		X
Llangollen	X	X	X			X		X	X		
Mapleton	X	X		X							X
Maritime Products			X								
McLaughlin (Res.)		X		X		X	X		X		X
McNaughton						X					
Morton Ball Park			X								

continued

Species Sites	*Aedes abserratus*	*Aedes canadensis*	*Aedes cantator*	*Aedes cinereus*	*Aedes diantaeus*	*Aedes excrucians*	*Aedes fitchii*	*Aedes provocans*	*Aedes punctor*	*Aedes sollicitans*	*Aedes stimulans*
Morton (woods)		X		X		X			X		
Superstore			X								
Wendland		X		X		X					X
Whitefrost			X								
Riverview	----------	----------	---------	----------	--------	----------	------	----------	--------	----------	----------
Coverdale Rd.		X		X							
Dobson Trail					X				X		X
Findlay		X	X								
Hawkes			X								
Henderson						X					
Mill Creek			X								
New Point Park			X								
New Rocca			X								
Point Park I			X							X	
Point Park II			X								
Point Park III			X							X	
RHS (bog)											
RHS (trails)		X							X		
Rocca			X							X	
Turtle Creek Rd.		X	X	X		X					
Weir			X								
Whitepine (ext)						X					

Table IV --- Distribution of species in the following genus : *Culex*, *Culiseta* and *Wyeomia*.
(May 7 to July 28 1997.)

Species Sites	*Culex pipiens*	*Culex territans*	*Culiseta minnesotae*	*Culiseta morsitans*	*Wyeomia smithii*
Dieppe	----------	----------	----------	----------	----------
Beaubassin			X		
DTDR				X	
Jacques					
Lafayette					
Parc St-Anselme					
Traffic Circle					
Moncton	----------	----------	----------	----------	----------
Centennial Park 4					
Centennial Park 6					
Glengrove Lagoon					
Irishtown Nature Park					
Llangollen					
Mapleton					
Maritime Products					
McLaughlin (Res.)				X	
McNaughton					
Morton Ball Park					
Morton (woods)					
Superstore					
Wendland					
Whitefrost					

continued...

Species Sites	*Culex pipiens*	*Culex territans*	*Culiseta minnesotae*	*Culiseta morsitans*	*Wyeomia smithii*
Riverview	----------	----------	----------	----------	----------
Coverdale Rd.					
Dobson Trail					
Findlay					
Hawkes					
Henderson					
Mill Creek					
New Point Park					
New Rocca					
Point Park I					
Point Park II					
Point Park III					
RHS (bog)					X
RHS (trails)					
Rocca	X	X	X	X	
Turtle Creek Rd.					
Weir					
Whitepine (Ext.)					

Table V – Sampling dates (for all species).
(May 7 to July 28 1997).

Sites	**Dates / Species** (percentage represented)
Dieppe	----------
Beaubassin	3 July 97 *Aedes cantator* 94 % *Culiseta minnesotae* 6 %
DTDR	13 June 97 *Aedes cantator* 97 % *Culiseta morsitans* 3 % 23 July 97 *Aedes cantator* 98 % *Aedes sollicitans* 2 %
Jacques	20 May 97 *Aedes cantator* 100 %
Lafayette	12 May 97 *Aedes cantator* 100 % 18 June 97 *Aedes cantator* 100 %
Parc St-Anselme	23 May 97 *Aedes provocans* 8 % *Aedes punctor* 23 % *Aedes canadensis* 69 %
Traffic Circle	7 May 97 *Aedes cantator* 100 %
Moncton	----------
Centennial Park 4	16 May 97 *Aedes cinereus* 100 %
Centennial Park 6	16 May 97 *Aedes cinereus* 100 %
Glengrove Lagoon	30 May 97 *Aedes excrucians* 100 %
Irishtown Nature Park	11 June 97 *Aedes punctor* 67 % *Aedes stimulans* 11 % *Aedes canadensis* 3 % *Aedes abserratus* 3 % *Aedes excrucians* 16 %
Llangollen	20 May 97 *Aedes cantator* 67 % *Aedes punctor* 11 % *Aedes canadensis* 22 % 21 May 97 *Aedes provocans* 19 % *Aedes punctor* 27 % *Aedes abserratus* 39 % *Aedes excrucians* 15 %
Mapleton	6 June 97 *Aedes stimulans* 79 % *Aedes canadensis* 2 % *Aedes abserratus* 4 % *Aedes cinereus* 15 %
Maritime Products	27 May 97 *Aedes cantator* 100 % 28 July 97 *Aedes cantator* 100 %

continued...

Sites	**Dates / Species** (percentage represented)
McLaughlin (Res.)	2 June 97 *Aedes stimulans* 4 % *Aedes canadensis* 96 % 11 June 97 *Aedes stimulans* 21 % *Aedes canadensis* 7 % *Aedes fitchii* 12 % *Aedes excrucians* 59 % *Culiseta morsitans* 1 % 7 July 97 *Aedes punctor* 12 % *Aedes cinereus* 3 % *Aedes canadensis* 85 %
McNaughton	16 May 97 *Aedes excrucians* 100 %
Morton Ball Park	22 May 97 *Aedes cantator* 100 %
Morton (woods)	4 June 97 *Aedes punctor* 17 % *Aedes canadensis* 55 % *Aedes excrucians* 28 % 12 June 97 *Aedes cinereus* 100 % 2 July 97 *Aedes canadensis* 100 %
Superstore	22 May 97 *Aedes cantator* 100 % 7 July 97 *Aedes cantator* 100 %
Wendland	12 June 97 *Aedes stimulans* 23 % *Aedes canadensis* 33 % *Aedes excrucians* 33 % *Aedes cinereus* 11 %
Whitefrost	24 June 97 *Aedes cantator* 100 %
Riverview	----------
Coverdale Rd.	9 June 97 *Aedes cinereus* 100 %
Dobson Trail	30 May 97 *Aedes punctor* 36 % *Aedes stimulans* 28 % *Aedes diantaeus* 36 %
Findlay	2 June 97 *Aedes cantator* 6 % *Aedes canadensis* 94 %
Hawkes	7 May 97 *Aedes cantator* 100 %
Henderson	2 June 97 *Aedes excrucians* 100 %
Mill Creek	7 May 97 *Aedes cantator* 100 % 27 May 97 *Aedes cantator* 100 % 24 May 97 *Aedes cantator* 100 %

continued...

Sites	**Dates / Species** (percentage represented)
New Point Park	13 May 97 *Aedes cantator* 100 %
New Rocca	14 May 97 *Aedes cantator* 100 % 22 July 97 *Aedes cantator* 100 %
Point Park I	7 May 97 *Aedes cantator* 100 % 15 May 97 *Aedes cantator* 100 % 26 June 97 *Aedes cantator* 100 %
Point Park II	13 May 97 *Aedes cantator* 100 % 26 June 97 *Aedes cantator* 100 %
Point Park III	13 May 97 *Aedes cantator* 100 % 26 May 97 *Aedes cantator* 100 %
RHS (bog)	30 June 97 *Wyeomia smithii* 100% 18 July 97 *Wyeomia smithii* 100 %
RHS (trails)	2 June 97 *Aedes punctor* 75 % *Aedes canadensis* 25 %
Rocca	14 May 97 *Aedes cantator* 100 % 22 July 97 *Culiseta minnesotae* 1 % *Culiseta morsitans* 1 % *Culex pipiens* 97 % *Culex territans* 1 % 25 July 97 *Culiseta minnesotae* 4 % *Culiseta morsitans* 2 % *Culex pipiens* 91 % *Culex territans* 3 % 28 July 97 *Aedes cantator* 98,6 % *Aedes sollicitans* 1,1 % *Culex pipiens* 0,3 %
Turtle Creek Rd.	9 June 97 *Aedes cantator* 28 % *Aedes canadensis* 48 % *Aedes excrucians* 22 % *Aedes cinereus* 2 %
Weir	7 May 97 *Aedes cantator* 100 %
Whitepine (ext.)	30 May 97 *Aedes excrucians* 100 %

Table VI – Ratios of sampled larvae.

Species	**Number**	**Percentage (%)**
Aedes cantator	1230	55,9 %
Culex pipiens	416	18,9 %
Aedes canadensis	180	8,2 %
Aedes excrucians	119	5,4 %
Aedes stimulans	82	3,7 %
Aedes punctor	53	2,4 %
Aedes fitchii	20	0,9 %
Aedes cinereus	17	0,8 %
Aedes provocans	15	0,7 %
Aedes abserratus	13	0,6 %
Aedes sollicitans	13	0,6 %
Culiseta minnesotae	11	0,5 %
Aedes diantaeus	10	0,5 %
Wyeomia smithii	8	0,4 %
Culiseta morsitans	6	0,3 %
Culex territans	5	0,2 %
Total	2198	100 %

Conclusion.

Between May 7 and July 28 1997, 16 species of mosquitoes were collected and identified throughout the Greater Moncton Area. The majority of individuals were sampled in marshes (~ 76 %) and were represented by 6 species , one of which (*A. cantator*), is by far the most numerous.

Forests and open areas both had numbers that weren't as high as in the marshes, but they both had a greater diversity (forests = 10 species, open areas = 9 species).

Marshes are therefore the areas that must be monitored the most if a greater number of mosquitoes must be irradicated during pest control programs.

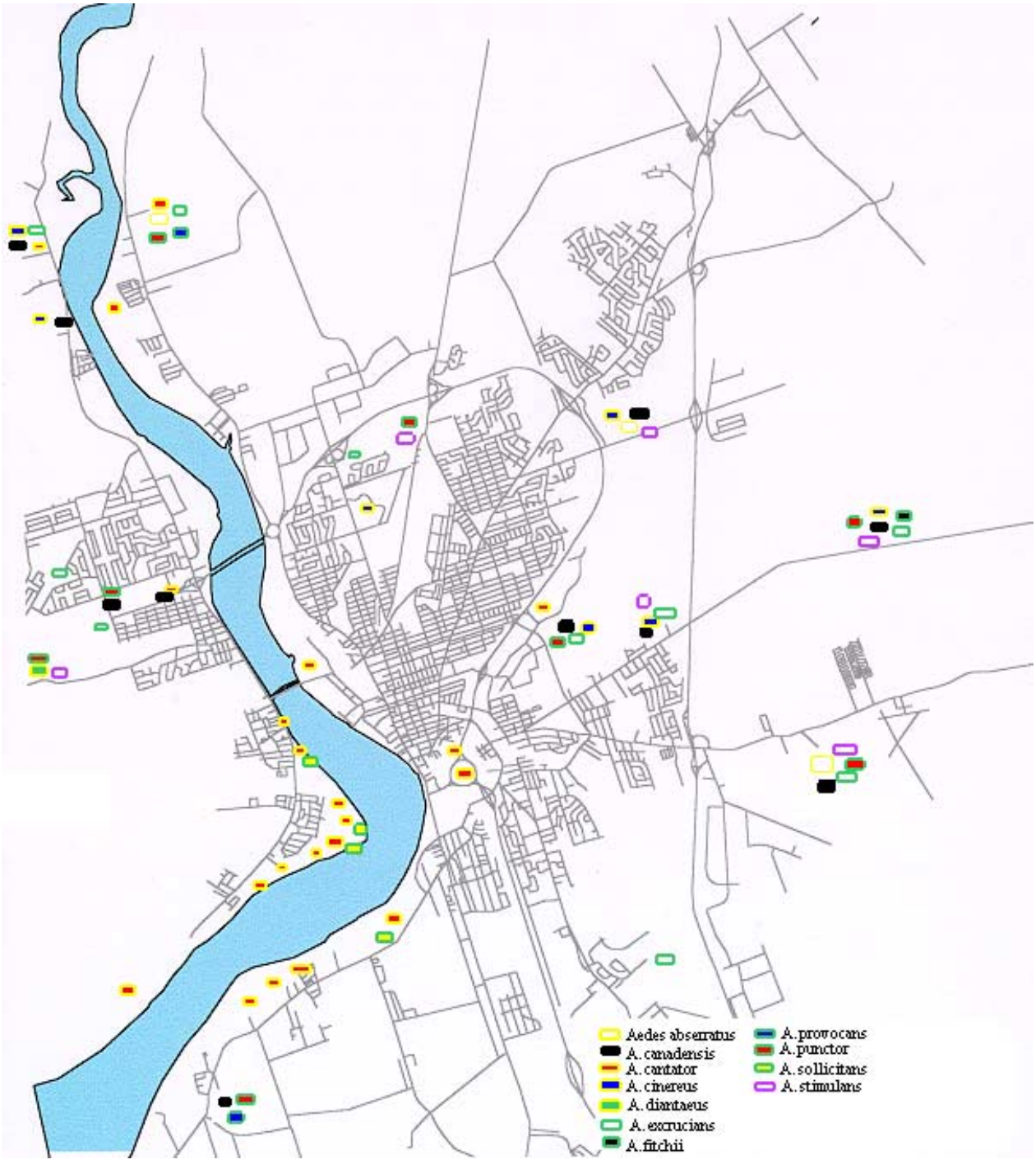
Sampling sites for mosquitoe larvae.
(May 7 to July 28 1997)

Key :

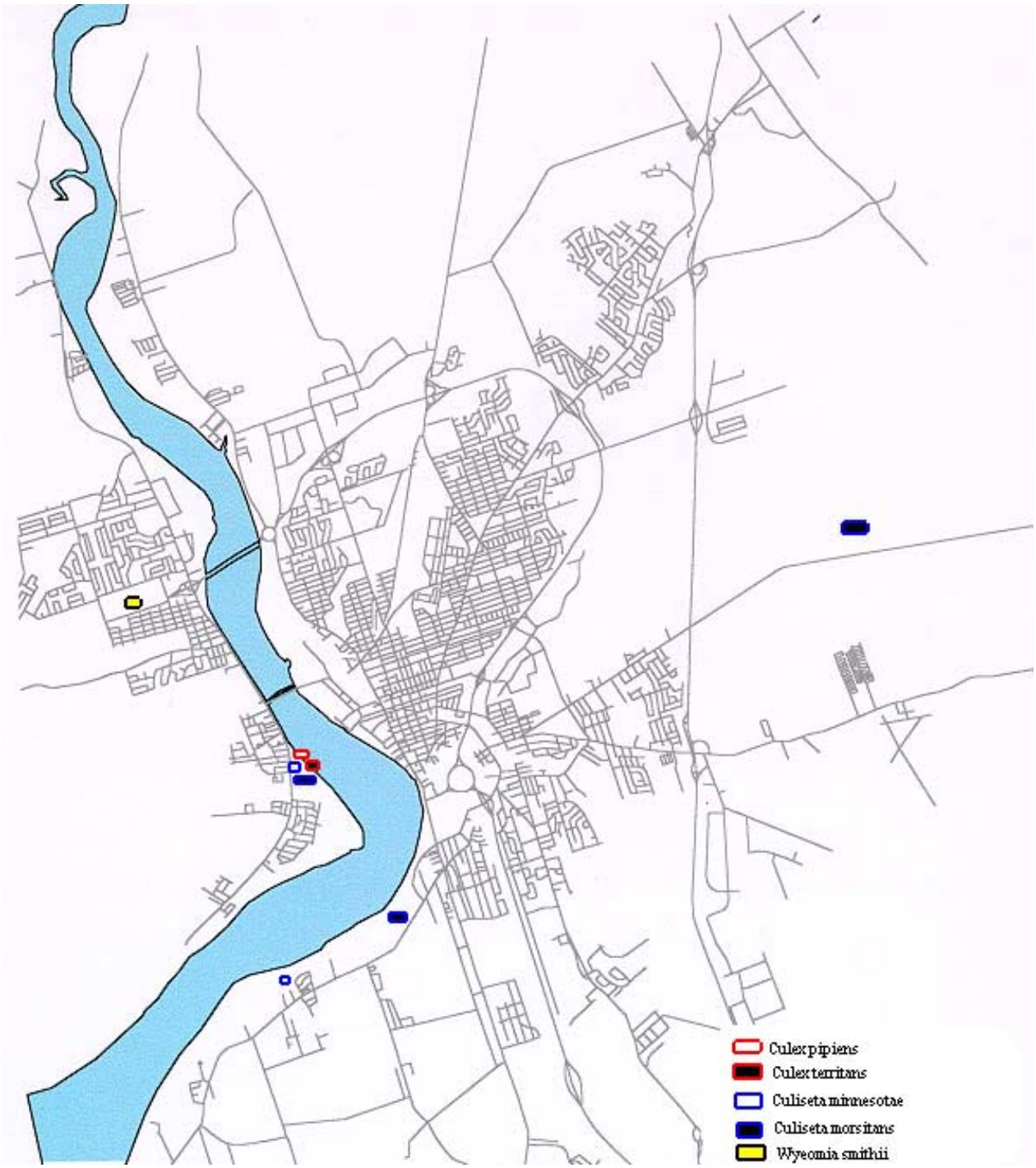
1-	Turtle Creek Rd. Superstore	7-	RHS(tourbière)	13-	Lafayette	19-	Point Park I	25-	Maritime Products	31-	Morton (bois)	37-	
2-	Llangollen	8-	RHS(trails)	14-	Jacques	20-	Point Park II	26-	Centennial Park 4	32-	Wendland		

3- Whitefrost
4- Coverdale Rd.
5- Henderson
6- Findlay
9- Whitepine (ext)
10- Dobson Trail
11- Mill Creek
12- Parc St-Anselme
15- Beaubassin
16- DTDR
17- Hawkes
18- Weir
21- Point Park III
22- New Point Park
23- Rocca
24- New Rocca
27- McNaughton
28- Centennial Park 6
29- Mapleton
30- Morton Ball Park
33- McLauhlin (res.)
34- Irishtown Nature Park
35- Glengrove Lagoon
36- Trafic circle

Distribution map for the genus *Aedes*.
(May 7 to July 28 97)



Distribution map the following genuses : *Culex, Culiseta* and *Wyeomia*.
(May 7 to July 28 1997)



Appendix -- Data collected during field work.
May 7 - July 28 1997 - Moncton, N.-B.

Date	Station	Sample	Temperature (°C)	pH	Larvae	Pupae	Volume H_2O (m^3)
7 May 97	Mill Creek	1	---	---	8	0	---
	Church	1	---	---	12	0	---
	Weir	1	---	---	15	0	---
	Hawkes	1	---	---	3	0	---
	Traffic Circle	1	---	---	4	0	---
	Point Park	1	---	---	6	0	---
	Rue des Copains	1	---	---	7	0	---
	Orin	1	---	---	***	***	---
12 May 97	Lafayette/Copains	1	---	---	11	0	0,1884
		2	---	---	28	0	0,1884
		3	---	---	46	0	0,1884
		4	---	---	21	0	0,2512
13 May 97	Point Park II	1	8	7,3	24	0	0,00055
		2	8	7,2	54	0	0,00055
	Point Park III	1	9	7,4	62	0	0,2514
	New Point Park	1	8	7,1	17	0	0,0628
14 May 97	New Rocca	1	10	7,6	***	***	0,0628
		2	11	7,3	50	0	0,0628
		3	11	7,0	4	0	0,01256
	Rocca	1	11	7,3	30	0	0,0314
		2	11	7,5	25	0	0,0628
15 May 97	Point Park	1	11	7,2	29	0	0,00942
		2	10	7,7	42	0	0,00314
		3	9	7,7	***	***	0,00942
	Gun Club	1	7	7,7	***	***	---
		2	7	7,8	***	***	---
16 May 97	Centennial Park 6	1	11	6,7	6	0	0,1256
	Centennial Park 4	1	11	6,6	5	1	0,0314
	McNaughton	1	13	6,5	5	0	0,2514
20 May 97 (rain)	Jacques	1	9	7,8	36	2	0,1257
	Llangollen	1	9	6,7	6	0	0,1257
		2	9	7,0	18	0	0,1257
21 May 97	Llangollen	1	10	7,3	456	16	0,06285
		2	11	6,8	67	0	0,0314
		3	11	6,9	47	36	0,2514
		4	10	6,8	267	0	0,1257
22 May 97	Superstore	1	11	7,7	34	4	0,00942
		2	11	7,7	102	0	0,1257

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Date	Station	Sample	Temperature (C°)	pH	Larvae	Pupae	Volume H_2O (m^3)
22 May 97	Morton Ball Park	1	10	7,8	96	0	0,1256
		2	9	7,8	119	4	0,0628
23 May 97	Parc St-Anselme	1	9	7.2	18	1	0,01884
		2	9	7.1	13	0	0,0628
		3	10	7,1	8	6	0,1257
27 May 97	Maritme Products	1	8	7,8	408	0	0,094275
		2	8	7,8	493	0	0,1257
	Mill Creek	1	8	7,3	33	0	0,02826
		2	8	7,7	48	0	0,7542
		3	8	7,5	63	0	0,1257
	Rocca	1	10	7,9	241	0	0,1885
30 May 97	Glengrove Lagoon	1	14	---	15	0	0,5028
		2	12	5,7	8	3	0,2512
	Dobson Trail	1	8	5,6	90	0	0,2355
		2	9	5,6	118	0	0,5028
	Whitepine Ext.	1	14	5,5	0	2	0,3771
		2	12	5,9	6	0	0,3771
2 June 97	Findlay	1	10	7,0	104	11	0,0471
		2	10	6,7	19	14	0,1527
	RHS	1	9	5,3	41	2	0,0471
	Henderson	1	13	5,8	29	1	0,2514
	McLaughlin	1	13	6,4	91	41	0,1256
		2	13	6,4	39	17	0,1256
4 June 97	Morton (woods)	1	8	6,0	36	25	0,1884
		2	7	5,7	17	0	0,0314
		3	8	5,7	210	0	0,0314
		4	8	5,9	61	5	0,0314
6 June 97	Mapleton	1	8	6,3	57	16	0,0314
		2	8	6,5	214	88	0,0628
		3	8	6,4	199	45	0,1257
		4	9	6,3	240	9	0,0628
		5	9	6,3	243	6	0,0628
9 June 97	Turtle Creek Rd.	1	10	7,3	52	5	0,2512
		2	11	7,3	33	8	0,1256
	Coverdale Rd.	1	13	7,4	13	40	0,0942
11 June 97	McLaughlin (res.)	1	15	7,5	8	4	0,0314
		2	16	6,9	59	9	0,2828
		3	15	5,7	51	80	0,3771
		4	12	5,2	111	17	0,0628
		5	15	6,1	20	13	0,0942
	Irishtown Nature Park	1	16	6,2	13	27	0,0314

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Date	Station	Sample	Temperature (C°)	pH	Larvae	Pupae	Volume H_2O (m^3)
11 June 97	Irishtown Nature Park	2	10	4,2	34	1	0,0157
		3	10	5,6	21	16	0,00314
12 June 97	Morton (woods)	1	10	5,6	11	24	0,0157
	Wendland	1	13	7,4	10	71	0,0314
13 June 97	DTDR	1	15	6,0	17	0	0,0471
		2	16	5,9	80	7	0,0942
		3	15	5,6	47	41	0,2514
		4	10	4,0	17	0	0,00055
		5	10	4,1	35	0	0,000825
		6	10	5,0	94	19	0,000825
18 June 97	Lafayette/Church	1	17	6,8	42	5	0,0314
24 June 97	Maritime Products	1	14	7,5	57	0	0,5028
	Whitefrost	1	15	6,8	155	0	0,1884
	Mill Creek	1	18	7,4	43	0	0,1884
		2	18	7,4	50	0	0,1256
26 June 97	Point Park I	1	13	6,5	497	0	0,01844
		2	13	6,5	138	0	0,0942
	Point Park II	3	13	6,6	29	0	0,00942
		4	13	6,5	119	0	0,0314
		5	13	6,2	38	0	0,1256
	Point Park III	6	13	6,5	1391	0	? ? ?
		7	14	6,7	63	0	0,0628
		8	14	6,6	530	0	0,0628
30 June 97	Dobson Trail	1	15	6,2	1	0	0,2514
	RHS (bog)	1	----------	-----	2	8	----------
2 July 97	Morton (woods)	1	18	5,5	3	0	0,0628
		2	20	4,5	14	0	0,0314
3 July 97	Beaubassin	1	20	7,1	92	0	0,1256
		2	20	7,1	102	5	0,00055
		3	18	6,8	41	0	0,000275
		4	18	7,3	17	0	0,000275
		5	18	7,3	58	0	0,000275
		6	20	7,2	110	1	0,000275
		7	20	7,1	47	11	0,0471
7 July 97	McLaughlin (res.)	1	16	5,5	18	79	0,2826
		2	15	6,1	24	3	0,0157
		3	17	4,6	66	8	0,0628
	Superstore	1	28	6,8	129	66	0,00055
		2	24	7,0	25	8	0,00942
		3	23	6,7	27	14	0,01257
		4	25	4,9	3	4	0,0628

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Date	Station	Sample	Temperature (°C)	pH	Larvae	Pupae	Volume H_2O (m^3)
18 July 97	RHS (bog)	1	----------	-----	6	4	----------
22 July 97	New Rocca	1	17	6,7	202	0	0,000275
		2	21	6,9	***	***	0,000275
		3	19	6,6	160	0	0,0628
		4	20	7,5	***	***	0,000275
	Rocca	1	21	7,4	36	3	0,0314
		2	21	7,4	8	3	0,0471
		3	25	7,3	76	17	0,0628
		4	23	7,1	105	4	0,1570
23 July 97	DTDR	1	19	6,4	210	0	0,000275
		2	21	6,5	284	0	0,0471
		3	21	6,4	1164	0	0,0785
		4	18	6,6	77	0	0,000275
25 July 97	Rocca	1	21	7,4	118	3	0,00055
		2	16	6,9	40	1	0,00055
		3	17	7,0	190	2	0,03771
		4	18	6,4	221	31	0,000825
		5	19	7,0	86	28	0,02826
28 July 97	Maritime Products	1	19	4,4	126	0	0,0314
		2	18	5,8	767	0	0,0628
		3	17	6,0	70	0	0,000275
	Rocca	1	19	7,2	151	0	0,00055
		2	19	7,2	98	0	0,00055
		3	18	7,3	188	0	0,00055
		4	18	7,4	116	0	0,00055

*** = Indicates that the individuals perished.
--- = Indicates that the information was not noted.

Reference

D.M. Wood, P.T. Dang and R.A. Ellis. 1979. *The Insects and Arachnids of Canada, Part 6. The Mosquitoes of Canada. Diptera : Culicidae.* Minister of Supply and Services. Canada.