

ABSTRACT

Des Lauriers, Angelune, 2004. *The Fate and Transport of Methoprene in an Urban West Nile Virus Mosquito Control Program*. A thesis presented to Ryerson University in partial fulfillment of the requirements for the degree of Master of Applied Science in the Program of Environment Applied Science and Management.

The recent occurrence of vector-borne West Nile virus in Canada has resulted in the use of larvicides for widespread urban mosquito control. The City of Toronto has focused its larviciding program on storm water catch basins as they are concentrated breeding grounds of the mosquito (*Culex pipiens*) most likely to carry West Nile virus. The City of Toronto undertook a larviciding program to control mosquitoes during the summer months of 2003. The larvicide approved for mosquito control in Canada is methoprene, commercially known as Altosid, in pellet formulation.

In order to determine the fate of the larvicide methoprene, the researcher, in conjunction with current studies at Ryerson University, the City of Toronto and the Ontario Ministry of the Environment, have undertaken a water quality monitoring study within the Toronto area. Three study catch basins in the Newtonbrook sewershed in Toronto, Ontario were dosed with methoprene (Altosid) pellets three times over the summer of 2003, at the recommended mosquito control dose of 0.7g. Water from each catch basin was sampled daily and analyzed for methoprene concentration, and mosquito larvae presence was observed. Precipitation, as well as the chemical composition of each of the catch basins was also monitored. A model catch basin in laboratory was also dosed with methoprene pellets and sampled daily to observe methoprene concentration over time.

The fate of methoprene in the urban environment is of interest, to ensure that the larviciding program is not compromising human and environmental safety. It was found that rainfall flushes methoprene from the catch basins into the storm sewer outfall. The storm sewer outfall did not release methoprene at detrimental concentrations during the sampling period. Many factors such as physical dissolution, chemical degradation and catch basin water volume, affect the concentration of methoprene in a catch basin. In order to monitor the impacts of larviciding programs, comprehensive water quality monitoring and mosquito control efficacy should continue.