

Adult mosquito control and malathion use for controlling West Nile Virus in Saskatchewan

What is adult mosquito control, and what is its role in Saskatchewan's West Nile Virus control program?

Saskatchewan's West Nile Virus control program has two main approaches:

- Public education on personal protection.
- Funding of an integrated approach to mosquito control, including basic measures to decrease mosquito breeding grounds, and the use of biological larvicides to decrease mosquito numbers.

There is also a limited role for spraying to control adult mosquitoes in certain specific situations where there is a high and increasing risk to human health despite other measures, and the short term use of an adulticide (spray) could be effective in decreasing that risk.

Currently malathion is the agent that would be used in Saskatchewan if there were a need for adult mosquito control.

What is malathion?

Malathion is an organophosphate insecticide, which has been registered for use in Canada since 1953. Most use in Canada is for controlling insects in agriculture. It is the most common agent used in Canada for the control of adult mosquitoes by ultra low volume (ULV) application. Compared with other insecticides it is relatively short lived in the environment.

How is malathion used?

In Saskatchewan's West Nile Virus control program, malathion spraying may be recommended in some specific circumstances where it is likely to be effective as a short term measure to reduce a high risk to human health. In these circumstances it will be done during the evening and nighttime, using truck mounted spraying units operated by licenced pesticide applicators. The spraying units are calibrated to distribute small droplets.

When spraying is recommended, an evaluation before, during and after the application will be conducted to assess the impact on mosquito numbers in order to judge whether a second, follow-up application is needed within the following week.

How will I be notified that spraying will be taking place?

Regional health authorities and the local municipal government will notify local residents in the spray area at least 48 hours in advance through a variety of means which may include notices, articles and advertisements in newspapers and electronic media as well as information delivered to households.

How safe is it for people?

As a result of the emergence of West Nile Virus disease in North America in 1999, the safety of malathion has undergone repeated assessment by regulatory agencies in both Canada and the US, particularly with respect to its use in mosquito control applications.

This type of assessment looks at evidence of health effects from an agent, and defines acceptable levels of use that include large safety margins below the lowest levels which may affect human health. The assessment for malathion includes the need to offer a higher level of protection to more vulnerable individuals such as pregnant women and children. It also takes into account the variety of exposure routes, which may be important (inhalation, skin exposures, ingestion of dirt by a toddler, for example).

The allowable levels of exposure are calculated on the basis that residents are outside when malathion is being applied in the area. This, of course, is not recommended, and people are advised to remain indoors during spraying, if possible, to further decrease exposure.

The evaluations have continued to conclude that exposures which occur in ultra low volume (ULV) application for mosquito control programs do not reach a level of concern for health effects in humans, and that malathion is acceptable for use in controlling mosquitoes that pose a public health hazard.

How effective is the spraying in decreasing the risk of West Nile Virus infection?

Best estimates are that mosquito activity decreases by 50% to 70% after an application of malathion. This decrease usually lasts a matter of several days to a week, but can be important in temporarily decreasing risk during a period of peak transmission. Sometimes a second application may be necessary. Risk of West Nile Virus infection is a function of the number of infected mosquitoes.

What side effects might people get in the area being sprayed?

With the levels of exposure that occur during spraying and the safety margins built into the regulatory process, significant health effects are not expected to occur.

Malathion aerosols have a chemical smell. The odor bothers some people, although it is not correlated with the levels of exposure, which are known to cause health problems. Being bothered by the odor is the most common health concern.

Sometimes people bothered by the odor also report minor symptoms such as eye, skin, nose and throat irritation, and nausea. These are usually short lived.

How can people reduce their exposure to malathion during a spray?

Health Canada's Pest Management Regulatory Agency (PMRA) recommends the following actions to reduce exposure to malathion:

- Whenever possible, remain indoors during and immediately after spraying.
- Close all windows and doors. Turn off air-conditioning units and close vents to circulate indoor air before spraying begins.
- Cover swimming pool surfaces when it is feasible.
- Cover outdoor furniture and play equipment or rinse them off with water after spraying is finished.
- Wash homegrown fruits and vegetables with water before cooking or eating them.
- Cover ornamental fish ponds to avoid direct exposure.
- If individuals, for one reason or another, wish to further reduce their exposure they can temporarily leave the area during the spray event.

Is malathion dangerous for pregnant women or children?

- The risk assessment done by PMRA takes into account that within a larger population there are more sensitive individuals, including pregnant women and children, and builds in safety factors for them in determining acceptable levels of use.
- The measures described above can further reduce exposure.

How harmful is it for the environment?

- Malathion is relatively short lived in the environment, with low toxicity for mammals. The breakdown is accelerated by sunlight and moisture.
- It is highly toxic for fish and aquatic organisms, which is why water bodies are protected from the spray areas.
- It is highly toxic for other insects, including beneficial ones, like honey bees.

Who determines the need for malathion use, and what are the criteria for its use?

The regional Medical Health Officer, in partnership with the Chief Medical Health Officer of Saskatchewan makes the decision on whether to spray.

Criteria for its use may include:

- Increasing numbers of mosquitoes infected with West Nile Virus.
- Increasing numbers of mosquito species capable of spreading West Nile Virus to humans.
- Presence of human or horse cases in the province or in neighbouring jurisdictions.
- Continued favourable weather for transmission of West Nile Virus.

- Limited likelihood that other mosquito control measures could improve the situation.
- Acceptable weather for spraying effectively and safely.
- A physical setting likely to lead to effective use of adulticide:
 - Since mosquitoes migrate back from the edges of a sprayed area, spraying small population centers is not likely to be effective.
 - The ability to effectively spray the areas where adult mosquitoes are likely to be flying.
- The time of year, which is important because of the mosquito life cycle. By mid August many mosquitoes will stop biting as they get ready for the winter.

Am I still at risk of infection after the spraying?

Spraying with adulticide provides some temporary additional protection beyond personal protective measures and an individual's efforts to reduce mosquito breeding sites around their homes. It does not eliminate the risk of disease. It is important to continue to think about protective clothing, insect repellants and the time of day that mosquitoes are most likely to be active. It is still important to remove sources of standing water around your residence.

What should I do if I come in contact with malathion being sprayed?

If you get malathion in your eyes rinse them immediately with water. Wash exposed skin with soap and water.

What should I do if I am in an area being sprayed, and develop minor symptoms like burning eyes, throat or nausea?

If you have not used the measures, described above, to limit your exposure you can do them now.

These types of symptoms are not common, and may well not be due to the malathion. If the symptoms are mild, give them some time to resolve on their own. If they persist until the next morning, contact your physician.

What should I do if I become seriously ill while the spraying is going on?

There is a large safety margin built into the way malathion is used in ULV applications, so health effects due to the malathion are not expected to occur, and the symptoms are likely from something else.

Of course, if you become seriously ill while spraying is going on, you should see a physician and have your health problem diagnosed. If the physician thinks it is related to malathion the physician should report the event to the regional Medical Health Officer.

Does spraying affect my pets?

Other mammals, like humans, are at low risk of toxicity from malathion. This can be decreased, by the same measures, which apply to humans, as described above.

Malathion is highly toxic for fish and other aquatic organisms, so covering of ornamental fish ponds during spraying events and for a period of time while the malathion is settling out of the air is important.

Where can I get more information?

Websites

http://www.hc-sc.gc.ca/cps-spc/pest/pestprod/malathion_e.html

<http://www.pmra-arla.gc.ca/english/pdf/pnotes/malathion-qa-e.pdf>

http://www.pmra-arla.gc.ca/english/pdf/fact/fs_malathion-e.pdf