



Environmental Health  
Association of Nova Scotia

## **Eight Reasons Why Spraying Pesticides is Not the Solution to West Nile Virus**

by Rebecca Watson *Spring 2003*

How much of a risk is West Nile Virus (WNV)? To some extent, only time will tell. But public health experts stress that there is no cause for fear and panic, or for panic driven "solutions." In fact, the so-called "solution" of spraying pesticides to kill mosquitoes will actually lead to bigger problems. Here are eight compelling reasons why spraying pesticides is not the answer to WNV.

### **1. Least Effective Measure**

The US Center for Disease Control and other experts say that spraying or fogging is the least effective means for slowing the spread of WNV carrying mosquitoes. For fogging to have maximum effect, a mosquito has to be flying. Estimates are that fogging kills only about 10% of adult mosquitoes. The federal-provincial task force on WNV admits there is little evidence for the efficacy of insecticide spraying. Adult mosquitoes live only about two weeks, with new larvae hatching constantly. This means that spraying cannot be a one shot operation, but needs to be repeated frequently if chosen as a means of control.

### **2. Predators Harmed, Mosquitoes Thrive**

Aerial spraying or fogging is more harmful to mosquito predators than to mosquitoes. Since predators are farther up the food chain, they will take in higher amounts of pesticide. By decreasing mosquito predator populations, aerial spraying actually leads to increases in mosquito populations. Data from a study in New York State published in the *Journal for Mosquito Control* found that after 11 years of insecticide spraying, the mosquito population had increased 15 times. Pesticide exposure also results in immune suppression in birds, which serve as the hosts for WNV. Birds exposed to organophosphate pesticides tend to suffer immune suppression (as do mammals, amphibians and other animals.) This makes them less able to fight off viral and bacterial infections,

the very opposite of what is needed. Once infected with WNV, birds are more likely to develop symptoms and to remain ill longer than if they had not been exposed. Thus, pesticide spraying leads to more frequent and longer infections and higher viral loads in birds, making it more likely they will spread the disease to mosquitoes. This increases the possibility of mosquitoes transmitting the virus to humans and other mammals.

### **3. Super Mosquitoes, Sicker Mosquitoes**

For some reason, as yet unknown, mosquitoes exposed to pesticides are more likely to have WNV in their salivary glands and develop a damaged gut lining which becomes more porous, allowing WNV to pass through. Over a decade of insecticide spraying to control encephalitis in Florida has not been effective, and mosquitoes are now 15 times more likely to pass on the disease. Mosquitoes, which have short life spans, go through many generations in a single year. The mosquitoes which are exposed to pesticides and survive are more likely to develop resistance to them. So aerial spraying contributes to the development of "super mosquitoes" which can only be killed by using higher amounts or different types of pesticides.

### **4. Immediate Human Health Effects**

Immediate health effects on humans from exposure to sprayed pesticides are considerable. A letter from 26 prominent physicians and scientists in Quebec released last summer states, "Indiscriminate spraying of pesticides, especially in heavily populated urban areas, is far more dangerous to human health and the natural environment than a relatively small risk of West Nile Virus.... Ironically, such spraying is especially dangerous to those with impaired immunity for whose 'protection' such spraying is mainly being done. ..Those individuals who are most vulnerable in this chemical action against mosquitoes include children, pregnant women, the elderly, chemically sensitive and immunosuppressed individuals, such as patients with AIDS and cancer, and people suffering with asthma and other allergies.

"Organophosphates are the most common class of pesticides used in mosquito control sprays. According to the United States Environmental Protection Agency (EPA), they are "efficiently absorbed by inhalation, ingestion and skin penetration" and were "the class of pesticides most often implicated in symptomatic illnesses among people in 1996."

### **5. Long Term Health Effects**

Pesticides used in mosquito control can contribute to immune suppression in humans. A report from the World Resources Institute notes, "Impairment of the immune system by chemical pesticides can lead to allergies, autoimmune disorders such as lupus, and cancer. It may also lead to infections to which one may be normally resistant." People with weakened immune systems are the most vulnerable to WNV. Thus, in the long term, aerial spraying may actually increase the

number of people who become seriously ill from WNV. And immune system suppression has serious implications for other diseases as well, including SARS.

Malathion, Naled and Resmethrin are pesticides commonly used in mosquito control. Malathion, an organophosphate, is neurotoxic. It is the most common pesticide used in aerial spraying. In studies on rats, pesticides were shown to impair the blood-brain barrier. In humans, the more serious effects of WNV occur when the virus crosses the blood-brain barrier. Malathion, like all members of the organophosphate family, disrupts nervous system function. Besides causing headaches, nausea and diarrhea, it has been linked to gene damage causing attention deficit hyperactive disorder (ADHD). Other health hazards identified in laboratory studies include damaged sperm, altered immune function, increased incidence of breast tumors, and increased risk of non-Hodgkin's lymphoma. Naled is another organophosphate which disrupts nervous system function, also causing headaches, nausea and diarrhea. Naled is most toxic when exposure occurs by inhalation. Lab tests connected exposure to Naled's breakdown product, dichlorvos, to aggressiveness and deterioration of memory and learning. Dichlorvos is also classified as a carcinogen, and interferes with prenatal brain development.

Resmethrin is considered by the World Health Organization as a "neuro-poison." Its effects on the human nervous system are similar to its effects in insects. Lab studies on rats showed that Resmethrin interfered with reproduction, increasing numbers of stillborns even at the lowest exposure tested.

## **6. Long Term Environmental Effects**

Most of the pesticides presently used for mosquito control do not selectively target mosquitoes. Malathion, Naled and Resmethrin kill all insects. This includes hundreds of beneficial insect species that pollinate crops and keep pests under control. Malathion is known to contaminate water, and is classified as highly toxic to most species of fish. In 1999, 90% of adult lobsters in Long Island Sound were killed by malathion used on land. Fish kills in the thousands have been reported following mosquito spraying. Since some species of fish feed on mosquito larvae, this is doubly counterproductive. Other organisms that feed on mosquito larva are also killed. Bird populations are also threatened. According to New York State wildlife pathologist Ward Stone, more of the birds sent to his unit for examination in 2000 died from pesticides than from WNV. Among the more frequent causes of bird death were broad band insecticides from the organophosphate category such as Dursban, diazinon and ethylparathion. Organophosphates used in mosquito control add harmful volatile organic compounds (VOCs) to the atmosphere, and are precursors of ozone (smog) forming chemicals. This means they are contributors to global warming.

## **7. Keep Risk in Perspective**

While the image of a new killer virus from the tropics is scary and makes for good media material, public health experts at all levels are attempting to help people put WNV in perspective. West Nile Virus is less dangerous than the flu. Only 1% of mosquitoes carry the WNV, even in places where WNV has been common for years. Because of our climate, the virus is not expected to overwinter, but would likely be reintroduced each year through bird migration. Less than 1% of people bitten by infected mosquitoes will have any symptoms, and most of those will be equivalent to a one day flu or headache. Studies in New York when WNV was most widespread found thousands of people who tested positive for WNV but had never experienced any symptoms of illness. People bitten by infected mosquitoes, even those who experience no symptoms, will develop a lifetime immunity to the disease. In Africa and Europe, the virus occurs in cycles, with typically three years of human infections in late summer, with the majority of infections in the first year of a cycle. Then the virus fades into the background, and may not reappear for many years. In Africa, WNV is a childhood disease; adults have developed immunity.

## **8. Taking a Long-term Approach**

WNV may be one of a number of tropical diseases which will spread to our geo-graphic area with global warnings. Instead of panic and sensationalism, we need a rational, long term problem-solving approach which is healthy for humans and the environment. Reducing mosquito breeding sites (standing water), known as source control, is the most effective mosquito control method. Since adult mosquitoes seldom travel more than 1 kilometer, source control in a neighborhood can be extremely effective and quite non-toxic. Experts stress the value of source controls such as mechanical flushing of sewer catch basins, and introduction of dragonfly larvae in nearby ponds and lakes. These methods have been practiced with great success in Wells, Maine for 26 years. Maintaining healthy mosquito predator populations is an important part of a mosquito control strategy. Eliminating mosquito larvae, through predators and biological means and if absolutely necessary via pesticides, is far more effective than trying to kill adult mosquitoes. And ultimately, the most effective defense against WNV is a healthy ecosystem and a healthy immune system in humans, birds and other species.

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