

WEST NILE VIRUS

INFORMATION SHEET

BACKGROUND

West Nile Virus (WNV) is an emerging issue for both public health reasons and as a concern for biodiversity. Bird populations in particular are most affected. WNV is spread from infected birds to non-infected birds (or other species) through adult mosquitoes. The virus can also be transmitted to some mammals, including horses, squirrels, raccoons and humans, and one reptile species; at this time, the risk of serious illness in humans remains relatively low. The Federation of Ontario Naturalists (FON) recognizes WNV as a concern for public health and as a potentially significant new invasive species in North America. In this information sheet, FON focuses primarily on issues relating to biodiversity and preventive measures to avoid contraction of WNV; for issues relating specifically to human health, FON encourages people to contact public health offices.

WNV originated in Africa and the Middle East where over time many species, notably birds, have evidently developed an immunity to the virus. In 1999, WNV arrived in North America at New York City, where large numbers of dead crows and jays showed their lack of resistance to this new virus on the continent. Since its arrival, the virus has spread rapidly across much of the United States and Canada and is expected to continue to spread further, potentially affecting increasing numbers and species of birds, mammals, and possibly other species.

IMPACTS ON BIRDS AND BIRD POPULATIONS

West Nile Virus is new to North America and wildlife populations have not yet been able to develop immunities, explaining the apparently high bird fatality rates in 1999-2002. WNV has been confirmed in over 110 species of birds in North America, and it is believed that many more species are likely to become infected. (Some reports suggest that 150 to 190 bird species have now been affected.) Some species, such as jays, crows, hawks and owls, are particularly affected by the virus. FON recognizes that there is the potential for a major impact on avian biodiversity and populations, and there is particular concern for rare and 'at-risk' species. It is too early to determine what the long-term impact of WNV will be on bird and other wildlife populations. Some species may be relatively unaffected, others may suffer significant declines and then have population recoveries, while others may suffer long-term negative impacts. Regardless of the potential impact on biodiversity and human health, WNV appears to be here to stay.

MOSQUITO BIOLOGY

Over 70 different species of mosquitoes have been identified in Canada. Each species has different behavioural characteristics, range and preferred breeding habitat. Several of these species have been found to act as disease vectors for WNV in Canada. One mosquito in particular is considered to be the most significant WNV vector in North America: *Culex pipiens*, or common house mosquito. This species prefers to breed in small pools of stagnant, dirty water containing enough organic material for the larvae to feed on, and these are the typical (and often unknown) potential breeding sites found close to households and neighbourhoods. *Culex pipiens* is most active from dusk to dawn, and takes cover under grass and brush during the day. It is a relatively weak flyer, and is not believed to travel very far from the larval habitat where it emerged. The full reproductive cycle of the mosquito (i.e. from egg to larva to pupa to adult) varies from about one to two or more weeks, depending on weather conditions and species. Some recent research suggests that the incidence of WNV increases later in summer, although it is possible to be bitten by a WNV-carrying mosquito even early in the mosquito season.

HOW TO PROTECT YOURSELF AND YOUR FAMILY

FON recognizes WNV as a new health risk for humans and encourages you to take precautions to prevent potential infection. Although the disease appears to be on the increase in North America, the overall rate of incidence remains very low and most people infected will show little or no effects. It is only in very rare circumstances that serious illness or death have occurred. The precautions listed below will reduce the opportunity for mosquitoes to breed and transmit the disease, thereby further reducing the chances of infection for you and your family; these measures may also help reduce the risk of transmission to wildlife species in your area.

Take personal precautionary measures

- Consider staying indoors at dawn and dusk (i.e. peak mosquito activity times);
- Wear light coloured long-sleeved shirts, long pants, socks and gloves or a “bug jacket”;
- Ensure all door and window screens fit tightly and are in good repair;
- Apply mosquito repellent to exposed skin and clothing, re-apply as needed;
- Consider encouraging natural predators by installing bat boxes and birdhouses.

Minimize potential Breeding sites on your property

- Rinse out bird baths, pool covers, plant trays, wading pools, pet bowls, etc. at least twice/week;
- Install aerators (i.e. bubblers) in garden ponds - or add goldfish (which eat the larvae);
- Cover rain barrels with tight fitting lids and/ or fine-meshed screening;
- Clean eaves troughs to prevent the inadvertent creation of breeding sites;
- Encourage municipalities to regularly clean out storm sewer catch basins.

The above-noted wet areas could inadvertently become breeding grounds for mosquitoes. These human-created places are very different from native wetlands, which are tremendously rich and important natural areas. Natural wetland habitats serve vital ecological functions, and are home to a diversity of wildlife and insect species, including an abundance of natural predators of mosquitoes.

Monitor the situation

- Stay informed to learn more about the disease and its presence in your area;
- Surveillance programs have been established in most areas and will help determine the impact of the disease and appropriate response measures;
- If you find a dead bird, contact your local health department and ask if they would like to study it, or if not, how you should dispose of it. Although the chance of contracting WNV from handling a dead bird or mammal is small, you should be careful and wear disposable rubber gloves and placing the dead animal in sealed, double plastic bags.

How you can help:

Little is known about WNV. One thing naturalists and other concerned citizens can do to help is to become involved in monitoring bird populations. Many bird survey programs already exist in which people (including non-expert birders) can become involved, such as the Breeding Bird Atlas, Project FeederWatch, Christmas Bird Counts and the Nocturnal Owl Survey. These surveys collect valuable information that will help show what is happening with the virus and with bird populations.

If you are interested in participating in bird surveys, please visit www.birdsontario.org or see the contact information listed below.
Ontario Breeding Bird Atlas – 1-866-900-7100
Project FeederWatch - 1-888-448-BIRD
Christmas Bird Count – 1-250-496-4049
Nocturnal Owl Survey – 1-888-448-2473

MOSQUITO CONTROL PROGRAMS

In addition to advising citizens to take the above precautions, many governments are planning or implementing various mosquito control programs. One potential form of control is the release of natural predators of mosquitoes into high concentration WNV areas (e.g. dragonflies, minnows). From an environmental perspective, this would appear to be the preferred and least harmful method of direct control, particularly if native predatory species are used.

Two forms of pesticides are being considered for potential control: larvicides and adulticides, which kill aquatic larvae and adult mosquitoes, respectively. Larvicides would be directly applied to stagnant water bodies and could include: (1) the biological control, *Bacillus thuringiensis israelensis* (Bti, a microorganism that kills only mosquito and blackfly larvae), and (2) the insect growth regulator, Methoprene (which is known to be highly toxic to crustaceans and insects, moderately toxic to zooplankton, and slightly toxic to fish and molluscs).

Adulticide pesticides, such as malathion, are toxic aerial sprays that are known to have significant negative environmental impacts. Malathion is highly toxic to honey bees, amphibians, insects and some fish, and moderately toxic to birds, crustaceans and other fish species. Attempts to eradicate mosquitoes through this form of pesticide would likely be ineffective at best, and at worst, harmful to human and ecological health. They may actually result in immune suppression in the virus and cause more long-term harm than good in efforts to control the spread of WNV.

FON RECOMMENDATION

FON encourages people to reduce the risk of infection by taking precautionary steps, such as minimizing the chance of being bitten (e.g. long-sleeved clothing, insect repellants, etc.) and minimizing breeding sites of mosquitoes in the human environment (e.g. cleaning eavestroughs, rinsing bird baths and pool covers, etc.). FON is continuing to monitor the WNV issue to determine the potential impact and effectiveness of targeted predators and biological controls for larval mosquitoes in areas with very high public health concerns. Where public health authorities determine that an intervention is absolutely required, it would appear that targeted application in specific locations (e.g. sewer catch-basins) of mosquito predators or the biological control, Bti, would have the least negative environmental impact. FON does not support the broad use of malathion or other 'adulticide' pesticides, nor does it support the destruction of natural wetland habitats which are home to a diversity of life.

FOR MORE INFORMATION ON WNV, VISIT THE FOLLOWING WEBSITES:

Audubon

www.audubon.org/bird/wnv

Health Canada

www.nile.healthcanada.net

Ontario Ministry of Health and Long Term Care

www.health.gov.on.ca/english/public/pub/pubhealth/westnile.html

1 (800) 268-1154; in Toronto call (416) 314-5518

Canadian Cooperative Wildlife Health Centre

<http://wildlife.usask.ca/english/frameWestNile.htm>

Centre for Disease Control West Nile Virus Homepage

www.cdc.gov/ncidod/dvbid/westnile/index.htm

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