

Vector-Borne Diseases: West Nile Virus (WNV) Lyme Disease (LD)



Annual Report 2007
Grey and Bruce
Counties



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EXECUTIVE SUMMARY

The purpose of the Vector-borne Disease program is to reduce or eliminate the spread of West Nile virus (WNV) and Lyme Disease (LD) in Grey and Bruce counties. This will protect the health of the residents in this region. Each component of the WNV program will be addressed in the following sections.

The WNV program in the Grey Bruce Health Unit (GBHU) consisted of the following components

- ❖ Public education campaign
- ❖ Dead bird and mammal surveillance
- ❖ Mosquito surveillance
- ❖ Lyme Disease Surveillance
- ❖ Human surveillance

In 2007, GBHU's main focus of the Vector-borne Disease program was on public education, dead bird and mammal surveillance, mosquito surveillance, tick surveillance and human surveillance. The reduction of standing water was a major focus and the health unit worked with municipalities on this issue.

The goal of public education was to increase public awareness of personal protective equipment (PPE) as well as to inform the public about standing water issues, mosquito trapping, bird and tick collection and testing. The residents were also provided with a hotline to call if they observed a dead bird. Strategies being used to promote public education included advertising, display boards, pamphlets and presentations.

In 2007, the results of dead bird and mammal surveillance indicated very little West Nile virus activity in Grey-Bruce with only one crow testing positive.

In 2007, the results of the passive and active tick surveillance indicated no Lyme disease activity in Grey-Bruce.

In 2007, the results of the human surveillance component of the WNV program revealed no human cases for West Nile virus.

The Rapid Risk Factor Surveillance Survey (RRFSS) was discontinued in 2007. The purpose of the survey is to gather information about the risk behaviours, attitudes, knowledge and awareness of health related topics. The ongoing education campaign would help increase knowledge and awareness of WNV as past results showed the public was not taking proper precautions against WNV.

A work plan has already begun for the 2008 West Nile virus season. Educational campaigns and surveillance components will be continued in 2008. At this point in time, very little consideration would be given to the use of larvicides or adulticides to control mosquitoes due to the very small prevalence of WNV in Grey-Bruce.

BACKGROUND

WNV was named after the West Nile province of Uganda where it was first isolated in 1937. Since then, it has been a well-documented cause of human disease in Africa, West Asia, and Eastern Europe. ⁽¹⁾

Prior to the summer of 1999, WNV had never been identified in the Western Hemisphere. The first known cases of WNV in the Americas occurred in New York City in the late summer and fall of 1999, resulting in an epidemic which caused 61 confirmed human cases of encephalitis, of which seven were fatal. ⁽¹⁾

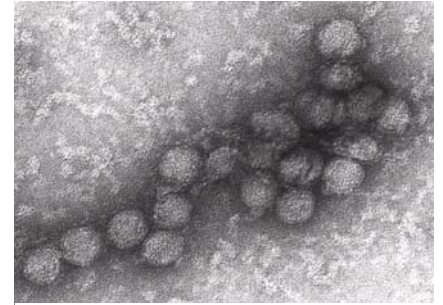


Figure 1: Electron micrograph

The method of importation of WNV into North America is unknown; it may have arrived in an infected human, migratory or imported bird, or mosquito. ^(1,2) During the winter of 1999-2000, the virus survived in mosquitoes in the New York City sewer system and in the summer of 2000 the virus was able to spread. ⁽²⁾

In 2001, WNV was confirmed for the first time in Ontario. Since then, the virus has spread to other provinces across Canada. Prior to 2002, Ontario had no non-travel related human cases recorded. ⁽²⁾

In 2002, Ontario was the “hot spot” in Canada for human WNV cases, with a total of 394 WNV cases reported. ^(1,3) In 2003, Saskatchewan was the “hot spot” in Canada for human WNV cases, with a total number of cases approaching 800. In Ontario a total of 87 cases were reported in 2003, 14 cases in 2004, 97 cases in 2005, 41 cases in 2006 (excluding travel cases) and 6 cases in 2007. ⁽⁴⁾

Locally, in Grey-Bruce in 2002, a total of three WNV positive birds were identified. There was also a single human case of WNV in a resident of the area. It is suspected that this individual contracted the illness while outside of Grey-Bruce. In 2003, a total of four WNV positive birds were identified though there were no human cases. In the 2004 season, a total of three WNV positive birds were identified. There were no human cases identified in 2004. In 2005, two positive birds were detected and three human cases were reported, two of which were suspected to be travel related and the third was inconclusive. In 2006, eight WNV positive birds were detected and no human cases. In 2007, one positive bird was reported in the Grey-Bruce region. However, no human cases reported in 2007.

WNV is a mosquito-borne illness that can cause disease and mortality in many species of birds and mammals, including humans. ⁽¹⁾ High bird mortality, especially in crows or ravens, may be the first “early-warning signal indicating WNV presence in an area. ^(1,5)

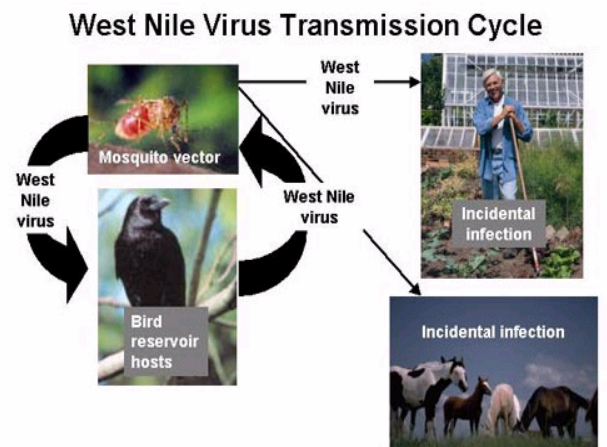


Figure 2: West Nile Virus Transmission Cycle. Courtesy of CDC.

The WNV propagates in nature primarily through a bird-mosquito-bird cycle of transmission, as well as through a bird-tick-bird transmission cycle, in which the ticks feed on birds that provide a reservoir of the disease. ⁽¹⁾ The WNV transmission cycle is illustrated in Figure 2. These cycles result in amplification of the virus in natural reservoirs, which can increase the amount of virus found in an area. A study conducted by Guptill, et al, suggests that WNV in humans is more likely when larger than usual numbers of WNV positive birds are found in a county early in the season. ⁽⁶⁾

The urban cycle of the disease requires species of mosquitoes that feed on both birds and humans. These are known as **bridge vectors**. In areas where the disease is endemic, the WNV has been found in mammals such as horses, camels, cattle, mice, hamsters, dogs, bats, and lemurs. ⁽¹⁾ Humans become infected with WNV when a mosquito bites an infected bird and then later bites a human.

The WNV program in the Grey-Bruce consisted of four main components. These components include a Public education campaign, Dead bird surveillance, Mosquito surveillance, and Human surveillance. The purpose of the WNV program is to reduce or eliminate the incidence of WNV in the area, thus protecting the health of the population. Each component of the WNV program will be discussed in more detail in the following sections.

PUBLIC EDUCATION CAMPAIGN

The WNV public education campaign was comprised of many promotional activities in 2007. The WNV display circulated through the South Bruce Grey Hospitals, which included Kincardine, Chesley, Durham, and Walkerton locations. This display became part of their overall “summer safety” staff wellness program. Pamphlets on WNV were sent with the display. The display was set up in the lobby of the Zehr’s grocery store in Owen Sound for two weeks in July. The display was also taken to the Saugeen First Nations Health Fair by one of the West Nile summer students where activity sheets were distributed to children.

A display was put up in the Owen Sound office lobby from June 1st until August 29th, 2007. This featured information on reducing and repelling mosquitoes and reminded parents that a children’s story book on the topic of WNV is available in libraries and Early Years Centres in Grey and Bruce Counties. Children’s activity sheets were dropped off at the YMCA daycare and to the Harrison Park day camp. A number of WNV pamphlets were distributed to tourist booths and conservation areas and many posters were distributed to all elementary and high schools in Grey and Bruce Counties.

The Grey Bruce Health Unit also accomplished its public education campaign through a combination of planned media releases and those done in response to media inquiries. Radio ads were spread throughout the summer, but with a focus at the beginning of tourist season in our area. This was to make the largest number of people in aware of WNV and the risk it poses to human health. The messages in the radio advertisements focused on reminding residents to remove standing water and take measures to avoid mosquito bites.

Radio advertisements aired on local stations throughout the summer including Mix 106.5, Country 93, The Beach, Fm 101.7 The One and 94.5 The Bull. A total of 164, 30 second advertisements aired on various weekends.

On the second two stations (101.7 and 94.5) the ads ran in two sets, the first set ran June 27th to 30th and the second set ran August 22nd to 25th.

GBHU also submitted prescheduled news releases to inform the public on various WNV related topics. These news releases included:

- ❖ **June 12, 2007: Making Health Happen** – Article in the Owen Sound Suntimes and the Hanover Post
- ❖ **July Issue: Body Bulletin Insert** – Body Bulletin is distributed to approximately 132 workplaces monthly by the Health Promotion Department
- ❖ **August 7-14:** Web tip on the front page of the GBHU website and on the outdoor sign at the Owen Sound Office

DEAD BIRD SURVEILLANCE

The objectives of the Ontario Ministry of Health & Long-Term Care (MOHLTC) dead bird surveillance program are to establish the temporal presence and geographic distribution of WNV activity.⁽⁵⁾ Bird mortality surveillance is conducted because it appears to be the most sensitive early detection method for WNV activity. It signifies local transmission and serves as an early warning of the potential risk to human health.⁽⁶⁾

From 2002 to 2007, positive bird cases usually preceded positive human cases in the majority of health units in Ontario.

Methods

The 2007 dead bird surveillance program was delivered in the same format as previous years. Residents of Grey-Bruce were asked to report dead birds to the health unit. Although information was collected on all reports of dead birds, only reports of crows, blue jays and ravens were forwarded to the area Public Health Inspector for possible submission for testing. When a positive bird was identified by the Canadian Cooperative Wildlife Health Centre (CCWHC), any other dead birds located within a 20 km radius of that site were not submitted for testing. The presence of the first positive bird confirmed the presence of WNV in the area and further testing was not deemed necessary.^(1, 7)

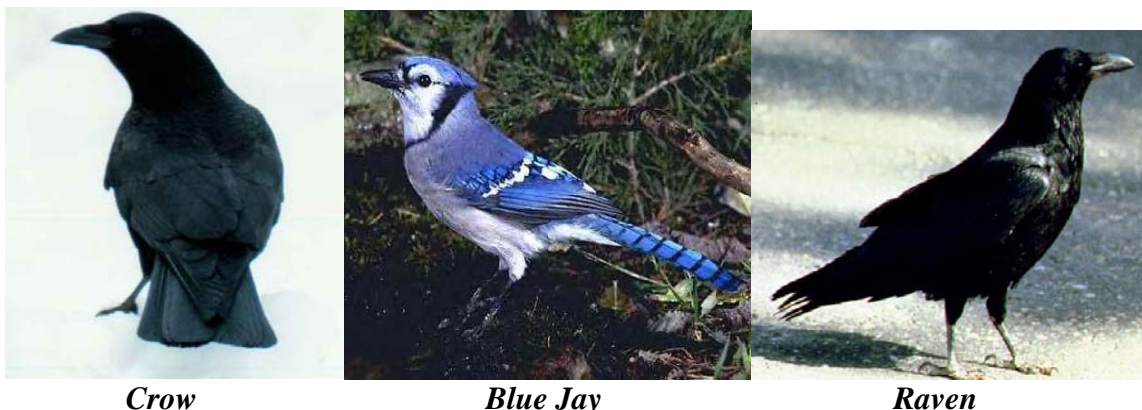


Figure 3 – Birds that are acceptable for WNV testing.

Results

The provincial program ran from May 8 to September 15, 2007. During this time, 37 sightings were reported, 14 birds submitted, with one crow testing positive. Generally, the CCWHC protocol requires health units that have 4 positive birds to discontinue sending birds for testing as the presence of WNV activity will have been established for that area. GBHU's bird submission program ended on September 15 as the CCWHC concluded its WNV viral testing program for the 2007 WNV season. Table 1 illustrates the species and location of WNV positive birds in Grey-Bruce from 2001 to 2007.

Table 1: Species, Submission Date and Location of WNV Positive Birds in 2001-2007

Date	Total Sightings	Total Tested	Species of Bird	Submission Date	Location
2001	48	32	No positive birds		
2002	75	26	Crow Crow Crow	July 25 August 12 August 15	Walkerton Hanover Normanby Township
2003	43	34	Crow Crow Crow Crow	July 9 July 18 July 21 September 16	St. Vincent Tara Durham Owen Sound
2004	20	20	Blue jay Crow Crow	May 20 September 4 September 22	Hanover Lion's Head Hepworth
2005	35	35	Crow Blue jay	August 15 August 22	Owen Sound Bentick
2006	33	29	Crow Crow Crow Crow Crow Crow Crow Crow	July 27 July 28 July 31 August 4 August 9 August 10 August 10 August 14	Ayton Hanover Walkerton Paisley Owen Sound Proton Station Durham Dundalk
2007	37	14	Crow	August 31	Owen Sound

Provincial Overview

The first health unit to report a positive bird in 2007 was York Region Health Unit on May 15. The last positive birds that were submitted were in Kingston, Frontenac and Lennox & Addington Health Unit and Leeds, Grenville and Lanark District Health Unit on August 15.

In 2007, 752 birds were tested for WNV by the CCWHC with 79 testing positive for the virus. On a national level, the CCWHC received over 1600 birds and tested 1594 of which 112 tested positive for WNV; about 70% of the positive birds detected by the CCWHC came from Ontario.

In 2007, not all health units had one or more positive birds. The pattern for 2007 was different to that observed in 2006, with only one positive corvid being found later in the surveillance season than in previous years. The cause of this is unknown; however, hot spring and summer temperatures and fewer submissions in the season are likely contributing factors.

DEAD MAMMAL AND OTHER BIRD SPECIES SURVEILLANCE

Beginning in 2003, the CCWHC began evaluating the impact of WNV on wild mammals and birds. It was recognized that although birds are usually the most recognizable and predominant host animal for WNV, this virus can also affect dogs, cats, horses, domestic poultry, apes, monkeys and alpacas. ^(9, 10, 11, 12, 13, 14, and 15)

Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) monitor equine health including WNV infection. In 2007, no horses were found positive for WNV.

The CCWHC requests health units to submit birds of any species and small mammals if they had exhibited neurological symptoms. In 2007, in Grey-Bruce there was one bird sighting but no submissions of dead mammals; two non-corvid species sent for testing which were negative (1 kingfisher and 1 grackle).

MOSQUITO SURVEILLANCE

West Nile virus (WNV) survives by circulating between bird and mosquito populations. ⁽¹⁾ The female mosquito can acquire WNV infection by obtaining a blood meal from an infected bird. After a two to three week amplification period, the infected mosquito can then pass the virus to another bird, horse, human or other animal by injecting its saliva while feeding on the animal. ⁽¹⁾

Canada is known to be home to approximately 75 species of mosquitoes of which 57 are found in Ontario. After active mosquito research was conducted across Ontario from 2001 through 2004, it was established that about 20 species / groups of species had tested positive for WNV and these vectors were ranked in order of preference for viral testing. This research indicates that *Culex pipiens*, *Culex restuans*, and *Culex pipiens/restuans* are the main species driving WNV in Ontario. At the close of the 2007 season a total of 19 pools of mosquitoes tested positive for WNV in Ontario.

Nine mosquito species which have been found to be significant in their ability to transmit the WNV have been found in the Grey-Bruce region. These eight mosquitoes are arranged into 2 categories, **bridge** vectors and **enzootic** vectors, based on their affinity for biting humans. ^(1,10)

Enzootic vectors primarily feed on birds (rarely mammals or reptiles) and thus carry out the amplification process in birds. ⁽¹⁾ Amplification is the process by which the virus increases in number in the bird population. Enzootic vectors include the following types of mosquitoes:

- ❖ *Culex pipiens*
- ❖ *Culex restuans*
- ❖ *Culisetta sp.*

Bridge vectors feed on birds and mammals (including humans) and are therefore the mosquitoes that can transmit WNV infection to people. ⁽¹⁾ Bridge vectors include the following types of mosquitoes:

- ❖ *Aedes vexans*
- ❖ *Anopheles punctipennis*
- ❖ *Coquillettidia perturbans*
- ❖ *Ochlerotatus stimulans*
- ❖ *Ochlerotatus triseriatus*
- ❖ *Ochlerotatus trivittatus*

Mosquito surveillance began in Grey-Bruce during the summer of 2003. The main objectives of the program for 2007 were to:

- 1) Count and identify mosquito species within Grey-Bruce relevant to human disease.
- 2) Determine the distribution of mosquito populations relative to human density.
- 3) To establish or project the need for intervention strategies (larviciding or adulticiding) to reduce or control mosquito populations.

Entomogen Inc. in St Catherines, Ontario conducted mosquito quantification and identification and performed WNV testing on submitted mosquitoes. The GBHU staff trapped and identified mosquitoes using approximately 10-11 traps per week for 13 weeks. Mosquito surveillance started on June 4, 2007 and continued through to September 15, 2007.



Figure 4: Trapping locations in Grey Bruce.

There were 19 trapping locations in 2007.

Methods

Routine mosquito surveillance was done throughout Grey-Bruce two times per week, from June to August using CDC light traps. Mosquitoes collected in these traps were identified internally. If a high number of *Culex* mosquito species occurred, the following week's trap was submitted to Entomogen Inc. for identification and viral testing.

Results

No WNV positive mosquito pools were found in the Grey-Bruce area in 2007. Of the 643 mosquitoes submitted to Entomogen included, 99 adult female mosquitoes were tested for WNV. In addition, 3650 mosquitoes were collected and identified by health unit staff.

Over 27 different species of mosquitoes were identified from the adult mosquito traps within the health unit. The presence of certain species of mosquitoes can be of greater concern, as only some types of mosquitoes are known to transmit WNV.⁽¹⁷⁾ The following pie graph shows the relative percentages of the vectors of concern for WNV trapped in Grey-Bruce.

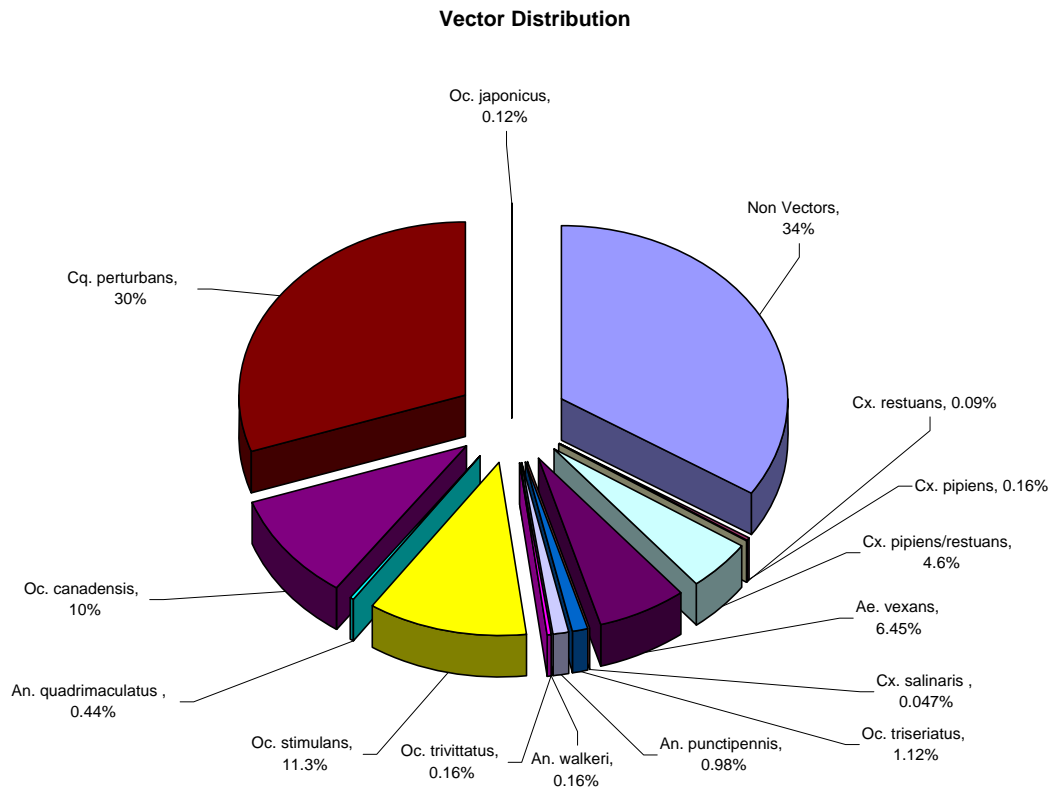


Figure 5: The vector mosquito species of concern for WNV found in Grey-Bruce.

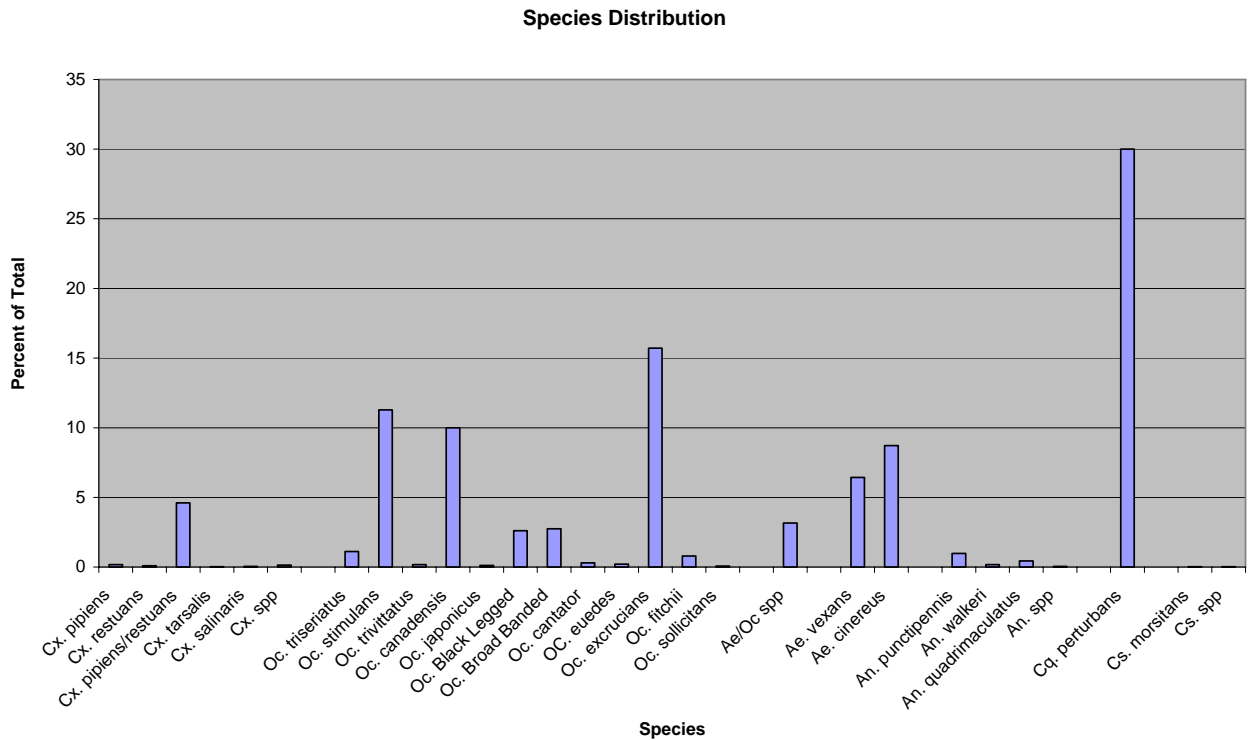


Figure 6: Species Abundance in Grey-Bruce in 2007


TYPE OF MOSQUITO	VECTOR TYPE	DISTINGUISHING FEATURES	HABITATS/HABITS
<p><i>Culex Pipiens</i> (2 %)</p> 	Enzoonotic	<ul style="list-style-type: none"> • Thorax is light brown to brownish grey. • Abdomen is banded white and brown above. Abdomen is kept parallel to support legs. • Wings brown 	<ul style="list-style-type: none"> • Thrives in urban and suburban environments ⁽²²⁾ • Favoured habitats include swamps, ponds and other bodies of stagnant water ⁽²²⁾ • Pollution tolerant ⁽²²⁾ • Can breed easily around human habitats ⁽²²⁾ • Like other species in the <i>Culex</i> genus, the female hibernates through the winter. Hibernation begins before the breeding season ends, where the impregnated female winters in dark places blocked from the wind (e.g., barns, outbuildings and cellars) ⁽²⁴⁾

Table 3 – Characteristics of the *Culex pipiens* mosquito


TYPE OF MOSQUITO	VECTOR TYPE	DISTINGUISHING FEATURES	HABITATS/HABITS
<p><i>Ochlerotatus</i> Genus (49%)</p> 	Bridge	<ul style="list-style-type: none"> • This species overwinters in egg stage⁽²³⁾ • Usually dark brown and dull in appearance⁽²³⁾ 	<ul style="list-style-type: none"> • <i>Ochlerotatus</i> mosquitoes have a pointed abdomen and cerci that are identical to those found in the genus <i>Aedes</i>⁽²⁴⁾ • Larvae develop on wooded floodplains caused by runoff • <i>Stimulans</i> occur especially near edges of lakes and large swamp areas • Throughout wooded areas of Southwestern Ontario they are possibly the worst pest species, especially in early summer⁽²⁴⁾ • Female <i>stimulans</i> are exceptionally long-lived, still common in August and early September⁽²³⁾

Table 4 – Characteristics of the *Ochlerotatus* mosquito


TYPE OF MOSQUITO	VECTOR TYPE	DISTINGUISHING FEATURES	HABITATS/HABITS
<p><i>Coquillettidia perturbans</i> (30%)</p> 	Bridge	<ul style="list-style-type: none"> • Is a rather large, brown and pale speckled mosquito, drab coloration, usually brown, white, black, or yellow combinations • This species has been identified as a vector for eastern equine encephalitis (South Dakota)⁽²⁴⁾ 	<ul style="list-style-type: none"> • Larval habitat is freshwater permanent ponds, lakes and marshes in areas with emergent vegetation, cat-tail marshes⁽²⁴⁾ • Larvae attach to underwater roots and stems and are "exceptionally hard to control" • Adult females are often vicious biters and will bite during the daytime in shady, humid places • Feeding spikes at dusk and after midnight • Prey on humans • Strong flier and will fly several miles to find hosts⁽²⁴⁾

Table 5 – Characteristics of the *Coquillettidia perturbans* mosquito


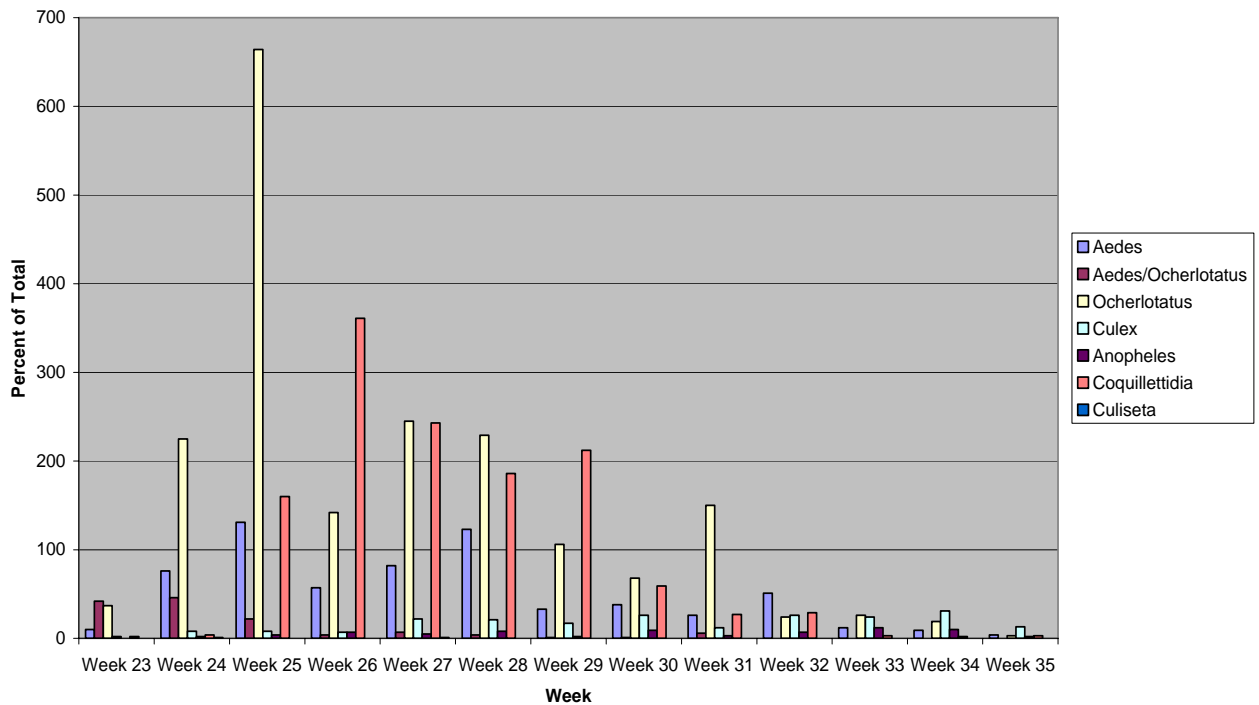
TYPE OF MOSQUITO	VECTOR TYPE	DISTINGUISHING FEATURES	HABITATS/HABITS
<p><i>Aedes Vexans</i> (6%)</p> 	Bridge	<ul style="list-style-type: none"> • Medium size and can range from pale to reddish brown • They are characterised by dark tarsi with narrow basal white rings⁽²³⁾ • This species overwinter in egg stage 	<ul style="list-style-type: none"> • Usually considered the worst mosquito pest in Canada ⁽²²⁾ • During wet summers the population can increase dramatically, developing from egg to biting adult in under 6 days ⁽²³⁾ • Favoured habitats include open, shallow grass filled depressions and woodland pools • Larvae usually found in permanent or semi- permanent habitats • Eggs will not hatch until a certain temperature is reached and can stay viable for several years ⁽²³⁾ • Very active from dusk till dawn but much less active during daylight

Table 6 – Characteristics of the *Aedes Vexans* mosquito

Weekly Mosquito Population by Genus



From Figure 7: The seasonal pattern can be seen for some of the types of mosquitoes found in Grey-Bruce.

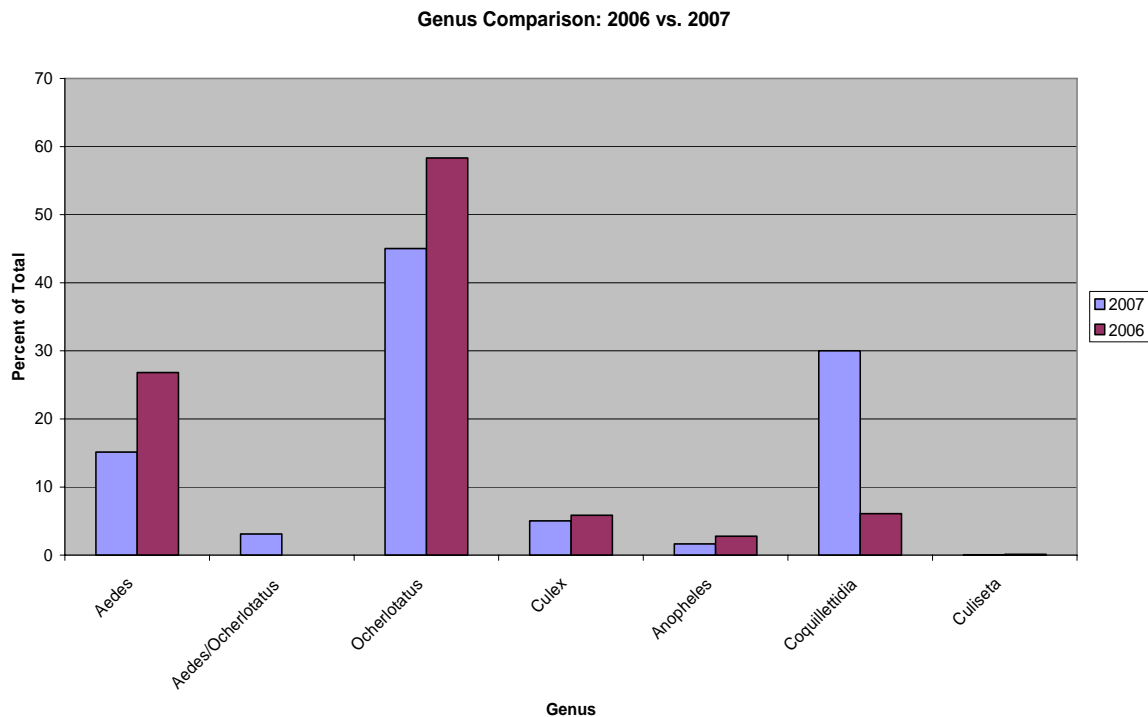


Figure 8: Grey-Bruce Genus distribution comparison between 2006 and 2007.

Figure 8 illustrates a general rise in *Coquillettidia* mosquitoes between 2006 and 2007. During the summer of 2007, there was a reduction in all other species.

Larval dipping

Larval dipping is a method used to identify mosquito breeding sites which consists of taking water samples from roadside ditches, permanent bodies of water, or catch basins.⁽¹⁸⁾ A dipper is utilized to gather the water samples, and a visual assessment is made to locate mosquito larvae. The quantity of larvae is counted and an average number of larvae per sample are determined. The purpose of larval dipping is to use the data to predict the pattern of future adult mosquito populations.^(1, 18)

Larval dipping was conducted at least once per week in various locations throughout Grey-Bruce. Samples taken resulted in minor quantities of larvae and pupae.

HUMAN SURVEILLANCE

The mosquito vector is the most common mode of transmission of West Nile virus (WNV). Mosquitoes become infected when they bite a WNV positive bird. The virus is not spread by person-to-person contact through touching, coughing, sneezing, or drinking from the same cup. However, alternate modes of transmission identified in 2002 in North America include human blood transfusions, organ transplants, maternal milk, intrauterine transmission and via occupational hazards in the cases of laboratory and ranch workers.⁽¹⁾

The incubation time (from the time of exposure to onset of disease) ranges from 3 to 14 days. Approximately four out of five people who are bitten and infected by a mosquito do not show any symptoms. This is referred to as *WNV Asymptomatic Infection*. While most

people who become infected will experience no symptoms or will have very mild illness, for some, the symptoms will be pronounced. For a very rare few, the virus causes serious neurological illness. ⁽¹⁾ This is called *WNV Neurological Syndrome*.

Approximately one in 150 cases of WNV will develop severe neurological disease. Symptoms of encephalitis are more commonly reported than meningitis. Encephalitis is an inflammation of the brain. Meningitis is an inflammation of the lining of the brain and spinal cord. It is very rare to progress to encephalitis or meningitis. Individuals may also experience acute flaccid paralysis. Acute flaccid paralysis is a polio-like syndrome that may cause loss of function of one or more limbs. For individuals with severe neurological disease, symptoms may include change in mental status, severe muscle weakness, seizures, sensitivity to light, difficulty walking, muscle paralysis, or death. Symptoms may persist for many months before recovery and some neurological effects may be permanent. ^(1, 19)

Figure 9 depicts a schematic diagram of the categories of symptoms individuals infected with WNV may exhibit.

West Nile Non-Neurological Syndrome is the milder form of WNV illness. Approximately 20% of those infected will develop this form of the disease. There is a sudden onset of one or more of the following: fever, headache, malaise, eye pain, muscle aches, weakness, nausea, vomiting, anorexia, photophobia, arthralgia, and less commonly a rash and swollen lymph nodes. ^(1, 19)

People of any age or health status can be infected with WNV. However, those over 50 years of age and those with weakened immune systems are at greatest risk for developing symptomatic illness. The risk increases with age, so the elderly are at highest risk for developing complications from WNV illness. ⁽¹⁹⁾

A vaccine is not available to prevent human illness from WNV. There also is no specific treatment for WNV. Hospitalization is often necessary for severe cases, in order to provide supportive therapy and rehabilitation.

Human Presentation

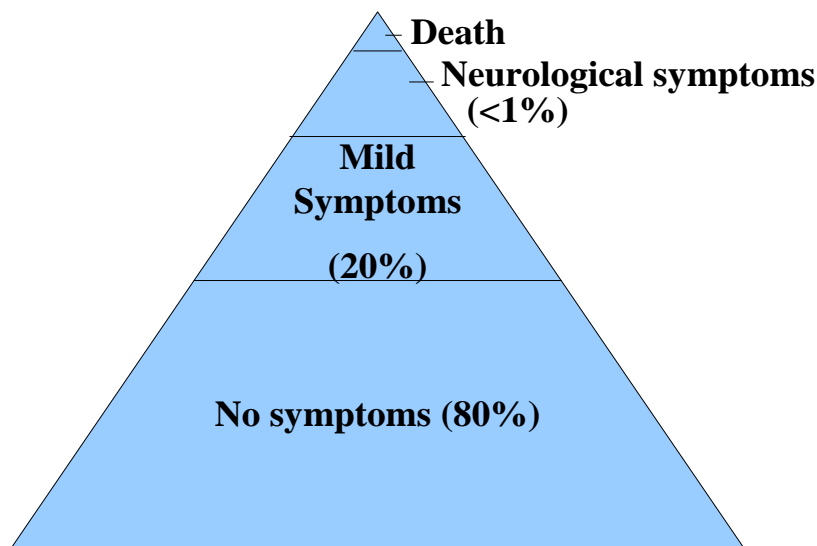


Figure 9: Schematic diagram of the types of symptoms individuals infected with WNV may exhibit.

Methods

West Nile virus is a reportable disease. Under the Health Protection and Promotion Act, laboratories and physicians are required to report cases of WNV to the local health unit.

In 2007, WNV cases were diagnosed serologically from blood samples that were processed at the Ontario Central Public Health Laboratory in Toronto. The results were usually available within a few days.

When individuals went to their family physician or to hospitals with symptoms that were consistent with WNV infection, blood tests were ordered to look specifically for antibodies to WNV. This virus can sometimes also be isolated from cerebrospinal fluid and other tissues or body fluids.

GBHU gathers medical information such as demographics, symptoms and travel history on possible, probable, or confirmed cases of WNV. It is important to determine if the person received or donated any blood, plasma, tissue or organs in the past eight weeks. If so, the Health Unit would immediately notify the Canadian Blood Services.

West Nile Virus Cases

Cases are defined as either probable or confirmed. The criteria for the definition are set by Health Canada and the Ministry of Health and Long-Term Care for each form of the disease and may change slightly from year to year.

A confirmed case has had a positive result on an additional confirmatory lab test. However, once a region in the province has had at least three confirmed cases; all cases are generally considered confirmed.

Results

In 2007, there were no human cases of West Nile virus in Grey-Bruce.

Weekly reminders were sent to all hospital infection control practitioners (ICPs) regarding the maintenance of heightened surveillance for patients presenting to hospital emergency rooms with signs and symptoms potentially related to West Nile virus.

In the province of Ontario, there were 13 cases of West Nile virus in 2007. In the previous year there were 42 cases of West Nile virus. The following graph displays the progression of West Nile cases from 2002 to 2007. A majority of Ontario's WNV cases occurred in Central East and Southwest regional health units.

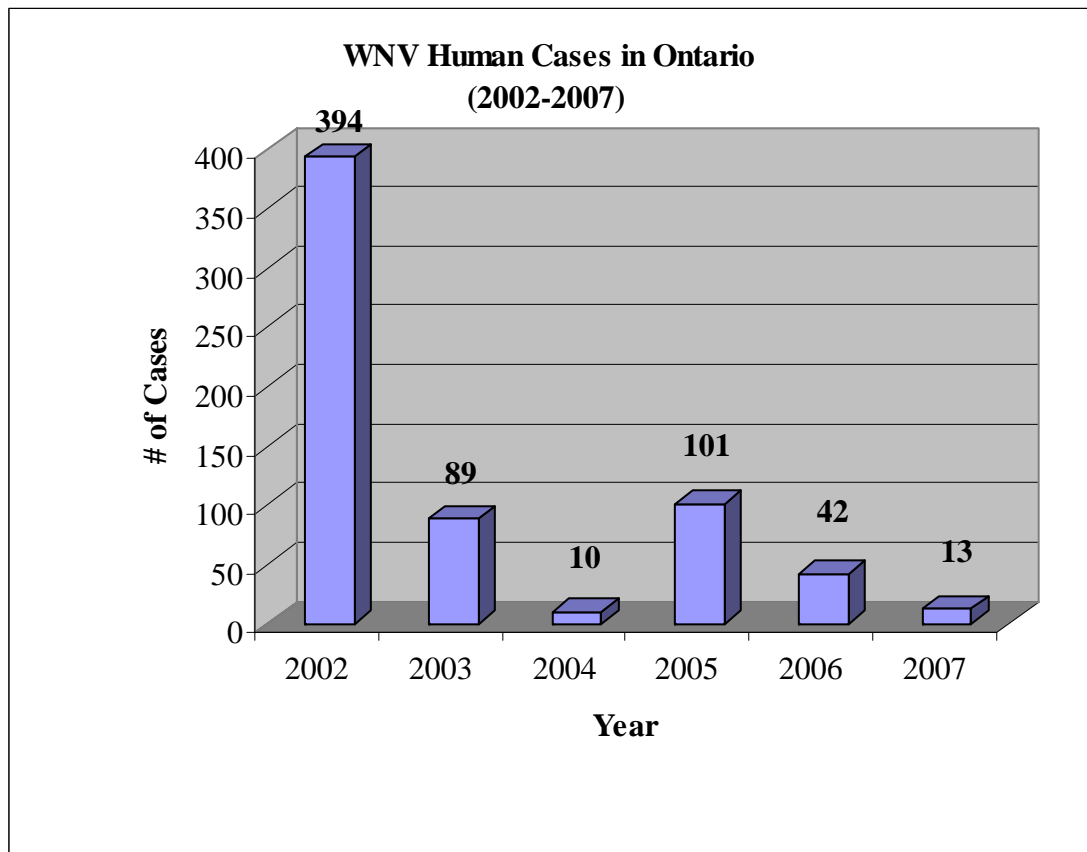


Figure 10: Total West Nile Virus Cases in Ontario from 2002-2007⁽⁴⁾

Grey-Bruce Cases 2002-2007

- 2002 – 1 case, likely acquired outside of Grey-Bruce
- 2003 – No cases
- 2004 – No cases
- 2005 – 3 cases, 2 of these likely acquired outside of Grey-Bruce and the third result was inconclusive
- 2006 – No cases
- 2007 – No cases

Summary Information

In general, the majority of WNV human cases were found in people between 30-79 years of age. There was an even distribution of cases between males and females. Of the 13 cases observed in 2007, there were 10 cases that presented with *West Nile virus non-neurological symptoms* while 1 case presented with neurological symptoms. There were 2 cases of asymptomatic infection in Ontario reported to the Public Health Agency of Canada (PHAC). These cases were identified through blood testing services.

LYME DISEASE

Lyme Disease (LD) is a zoonotic illness caused by the bacterium (*Borrelia burgdorferi*) and is transmitted through the bite of an infected deer tick or black-legged tick (*Ixodes scapularis*). The symptoms of the disease include a bull's eye or "erythema migrans" skin rash, systemic and neurological symptoms. ⁽²⁵⁾

Lyme Disease Surveillance – The prevalence of Lyme disease is relatively low in the Grey-Bruce region. The white tailed deer is a potential reservoir of LD because they harbour ticks. Since Grey and Bruce Counties has a large number of deer, surveillance is warranted to monitor any potential cases of LD. The surveillance looks at any incidence of LD through Passive and Active Surveillance.

Passive Surveillance – Ticks involved in any bite incidents with people are submitted to the Public Health Laboratory for testing of *Borrelia burgdorferi* bacteria. This is the pathogen responsible for Lyme Disease in humans. Five ticks have been submitted for testing and all reports were negative.

Active Surveillance – This method actually involves going out to areas where ticks are known to inhabit and human interaction is likely to occur to perform drag sampling. The purpose of drag sampling is to catch as many ticks as possible and send them to Public Health Lab for testing. Drag sampling consists of dragging a flannel cloth over and around vegetation where ticks may be waiting for a passing host. ⁽²⁶⁾ On August 16 and 24, 2007, drag sampling was done in some provincial parks and escarpments in Grey and Bruce Counties. The *Ixodes scapularis* tick was not isolated in the drag sampling.

Human Cases

There were no reported cases of Lyme Disease in Grey and Bruce counties in 2007. The last reported case was in 2005 and it was found to be a travel related exposure outside the Grey Bruce Health Unit. There were 59 reported cases of Lyme Disease in Ontario in 2007. In the previous year, there were a total of 38 confirmed cases of Lyme disease (LD) reported in Ontario. The figure below illustrates the prevalence of Lyme Disease in the province of Ontario. Most of the cases reported were acquired outside the province.

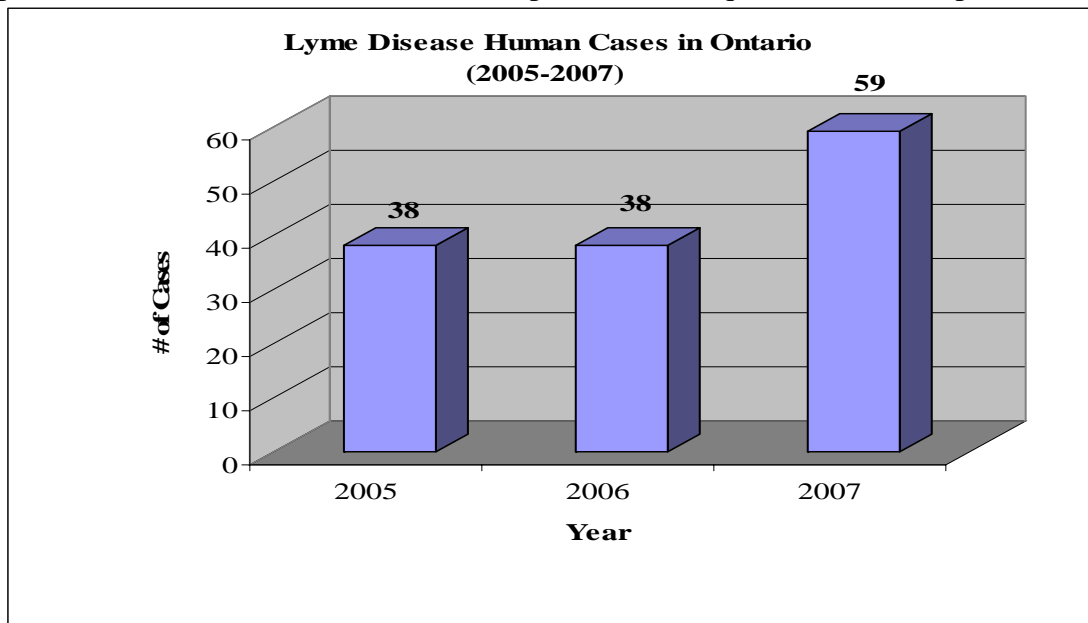


Figure 11: Total Lyme Disease Cases in Ontario from 2005-2007

PROPOSED VECTOR-BORNE PROGRAM ACTIVITIES FOR 2008

Below is a brief summation of the Vector-Borne Program activities the Grey Bruce Health Unit plans to accomplish in 2008.

Public Education

Continue to:

- ❖ Provide general information to the public through a variety of media strategies to increase their awareness of vector-borne diseases (WNV & LD) and prevention strategies.
- ❖ Emphasize the importance of personal protective equipment (PPE).
- ❖ Encourage the reduction of mosquito breeding sites (e.g. stagnant pools of water) and submission of ticks.
- ❖ Update the Grey Bruce Health Unit's web site throughout the season.

Surveillance

- ❖ Continue to coordinate this component and incorporate any changes as required by the Ministry of Health and Long Term Care or Health Canada.
- ❖ Continue with surveillance activities in accordance with the Ministry of Health and Long Term Care and Canadian Cooperative Wildlife Health Centre.
- ❖ Map the exact locations of bird sightings and bird, animal, mosquito and tick submissions using a computerized GPS/GIS system.
- ❖ Consider the use of larvicides and adulticides to control the mosquito populations in the Grey-Bruce if deemed necessary by assessing the level of risk.
- ❖ Continue with passive tick surveillance.
- ❖ Monitor the need for active tick surveillance through tick submissions and human cases of Lyme disease.
- ❖ Map results of any positive human cases of West Nile virus and Lyme Disease.

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