



The Niagara Beeway

**Honey Bee Education, Awareness
& Habitat Improvement**

Presentation for

Latornell Conservation Symposium

November 2019

Beeway Background

Over 19 years ago, the Niagara Beeway project was engaged in honey bee swarm response. Canadian Tire and Home Hardware, police, fire, and municipal services cooperated in identifying honey bee swarms in inappropriate places in Niagara. Bees were recovered safely and removed. These bees are used for apprentice training.

Swarm recovery and complaint calls clearly produced a pattern with over 80% of swarm calls occurring within 2 km of the Welland Canal portion of the St. Lawrence Seaway. In 2013 over 80% of calls were within 200 metres of the banks of the Welland Canal. Honey bees were flourishing near this waterway.

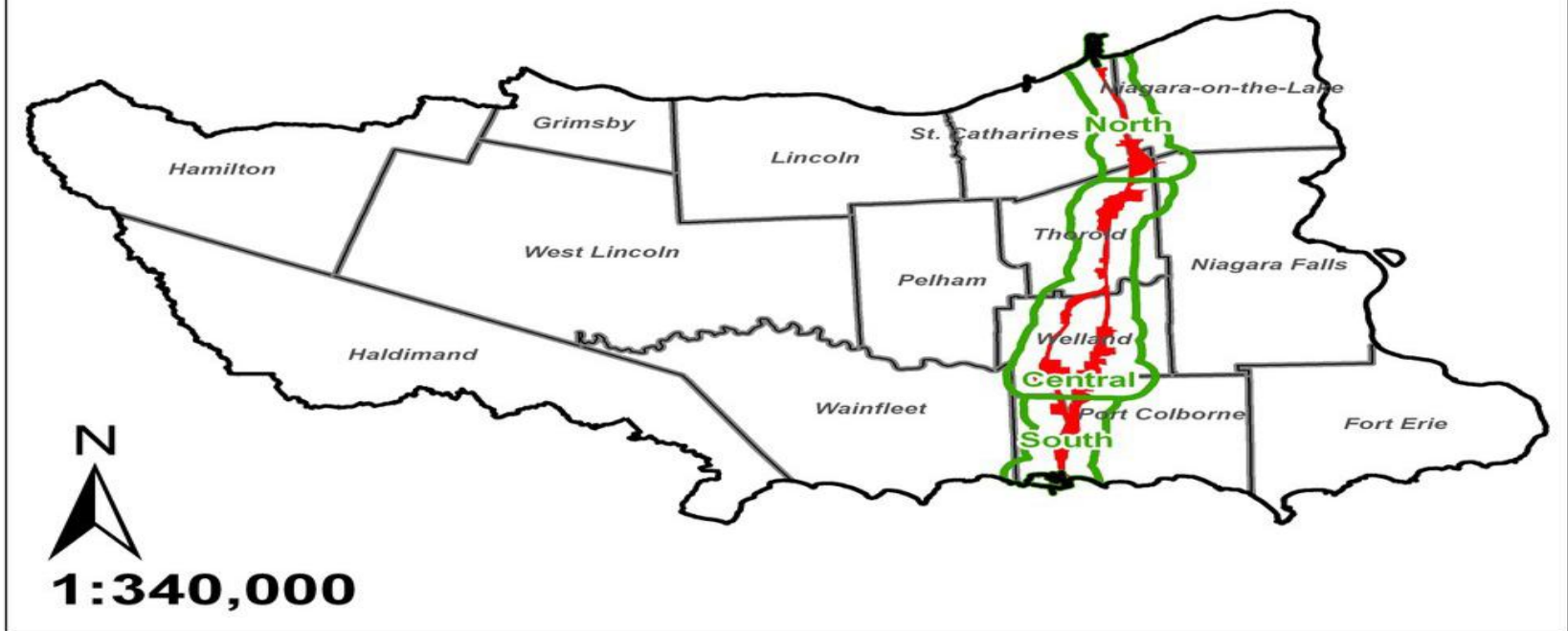
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The Seaway/Beeway

The Niagara BeeWay

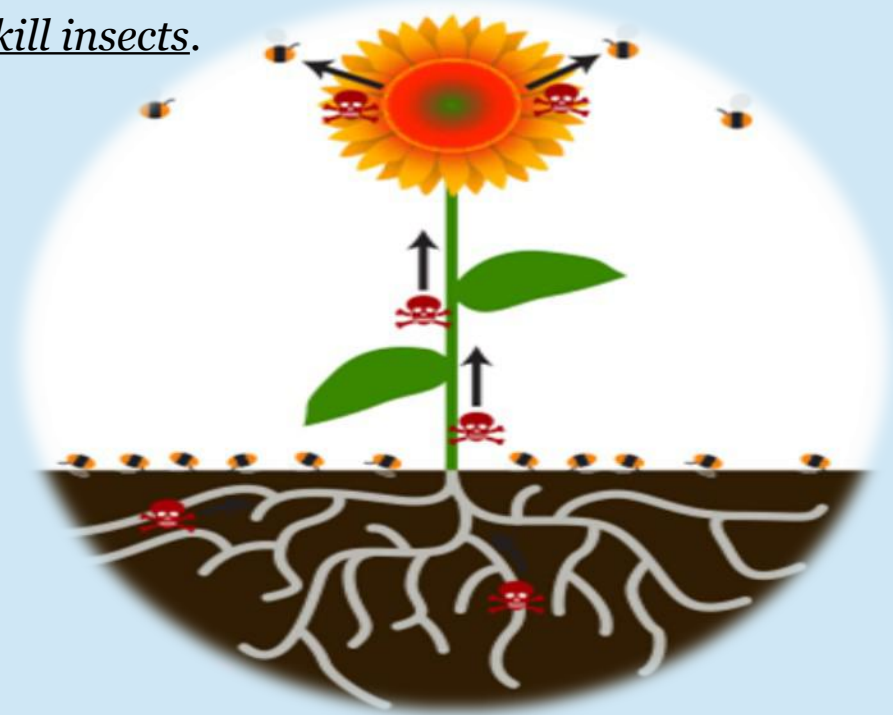


Agricultural, municipal drainage contaminated with neonicotinoids are absent from the Welland Canal water as this section of the Seaway is man made and above agricultural drainage. The honey bees collected by the Niagara Beeway team are all from this zone. This zone may be the last place of contamination within the tolerance of the honey bees.

What are neonicotinoids?

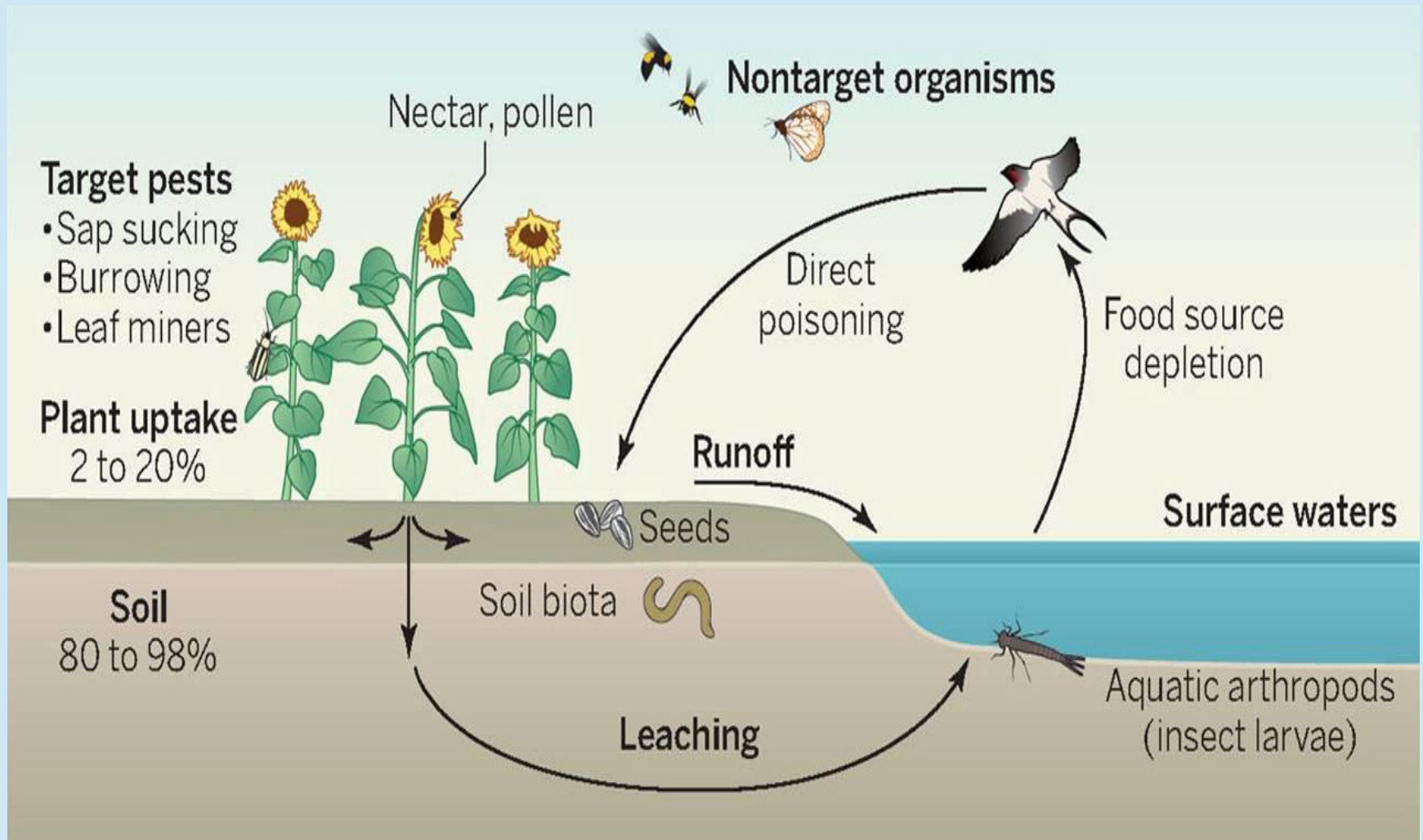
Neonics are systemic neuro-toxins used to kill insects.

“**Systemic**” means they enter the vascular system of the plant or animal. The toxic material enters and spreads to all parts of the plant or dog or absorbent. Any insect biting into this toxic system is exposed to the neuro-toxin. At 30 parts per billion, the insect has received the recommend lethal dose – end of insect.

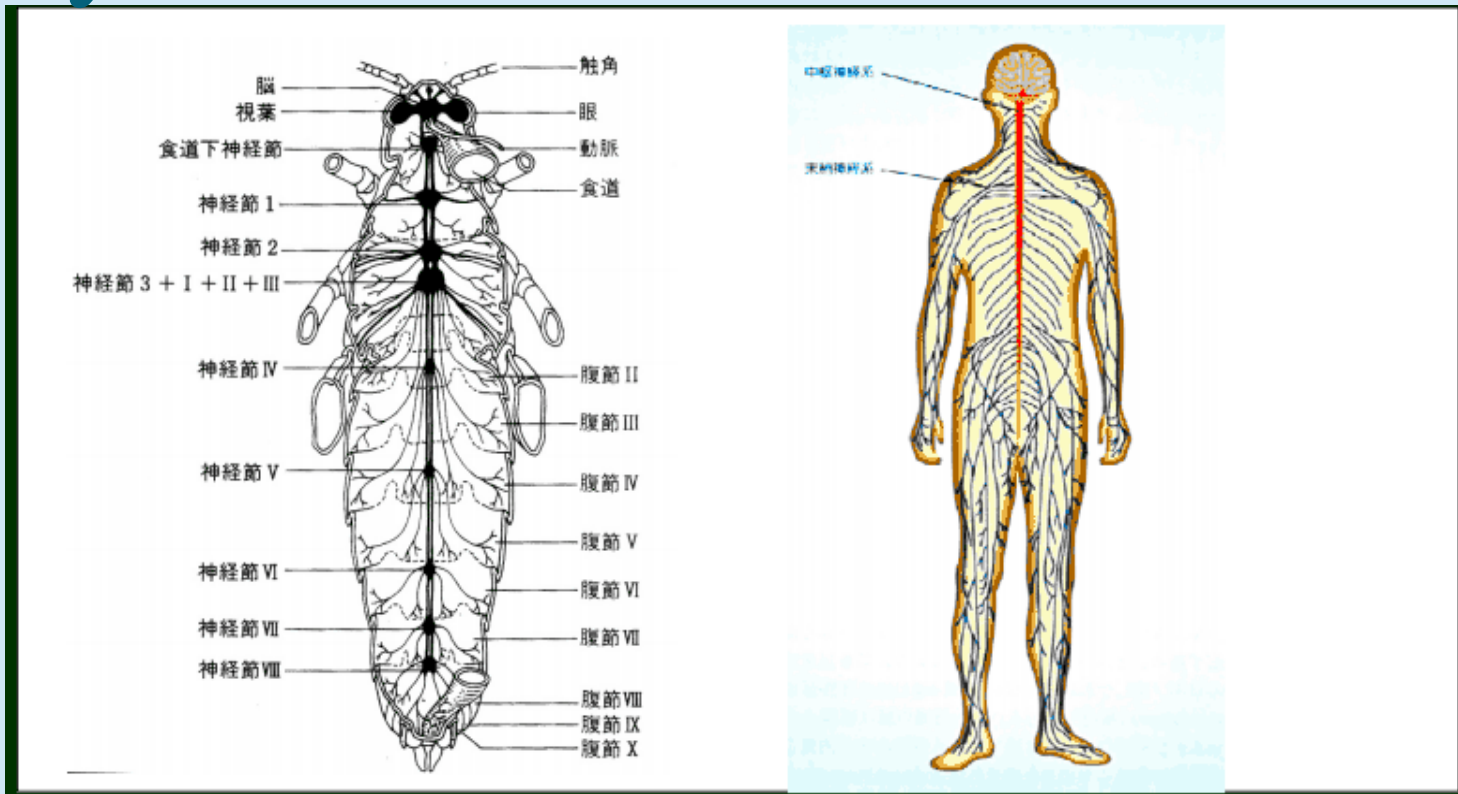


These new and more efficient neonics are unlike any previous insecticide. The current residual limit is 3 times higher than the lethal dose for insects as recommended by the Ag Chem Manufacturers.

The Life Cycle of Neonics



Basic structure of human nervous system is similar to insect one



- Major information chemicals (for example acetylcholine, glutamate) are same in human and in insect.
- Organophosphates and neonicotinoids obviously effect both human insect.

Rising Toxicity of pesticides 1945-2003

Pesticide	Brand Name	Use	LD50 (ng / bee)	Toxicity DDT = 1
DDT	Dinocide	Insecticide	27,000.0	1
Amitraz	Apivar	Acaricide	12,000	2
Coumafos	Perizin	Acaricide	3,000	9
Taufluvalinate	Apistan	Acaricide	2,000	14
Metiocarb	Mesurol	Insecticide	230	117
Carbofuran	Curater	Insecticide	160	169
Lambda-cyhalothrin	Karate	Insecticide	38	711
Deltamethrin	Decis	Insecticide	10	2,700
Thiametoxam	Cruiser	Insecticide	5	5,400
Fipronil	Regent	Insecticide	4.2	6,429
Clothianidin	Poncho	Insecticide	4.0	6,750
Imidacloprid	Gaucho	Insecticide	3.7	7,297

Source: Dr. J.M. Bonmatin, CNRS (France)

Note: In 1945 it took a does of 27,000 nanogrammes of DDT to kill 50% of bees.

Note: Neonics at bottom of the table; imidacloprid achieves an LD50 kill of bees with just 3.7 nanogrammes. Less than 1/7000th of the dose required with DDT.

Imidacloprid is 7,000 times more toxic to bees.

Neonicotinoid Pesticides Severely Affect Honey Bee Queens

Article | **OPEN**

Neonicotinoid pesticides severely affect honey bee queens


Geoffrey R. Williams, Aline Troxler, Gina Retschnig, Kaspar Roth, Orlando Yañez, Dave Shutler, Peter Neumann & Laurent Gauthier

Scientific Reports **5**,
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The Urban Impact of Neonicotinoid Use

- Neonics are used by non-farm/ornamental users in large volumes. Neonic based flea control drops are 80,000 ppbillion. There are pallet loads of neonics in stock in Niagara for non farm/ornamental use.
- Neonics are used by non-farm/ornamental users in extremely high concentrations.
 - a. Farm lethal insect control 30 parts per billion
 - b. Flea control drops 80,000 parts per billion
-  Neonics are used by non-farm/ornamental users every month, year round.
 - a. Farmers use neonic coated seeds in the spring with occasional fall plantings of winter wheat.
 - b. Dog drops are recommended by the chemical manufacturer to be used monthly.

- Neonics are poorly identified to non-farm/ornamental users
 - a. Farmers order specific treatments, applied to seeds under quality controlled conditions.
 - b. Material Safety Data Sheets and technical bulletins clearly indicate acutely toxic to bees, acutely toxic to birds, for farmers.

Material Safety Data Sheet		
ADMIRE® 240 FLOWABLE SYSTEMIC INSECTICIDE		MSDS Number: 10200006536 MSDS Version 1.3
Potential Environmental Effect	Highly toxic to bees. Extremely toxic to aquatic and estuarine invertebrates.	
SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS		
<u>Hazardous Component Name</u>	<u>CAS-No.</u>	<u>Average % by Weight</u>
Imidacloprid	138261-41-3	21.40
Glycerine	56-81-5	10.00

Non-farm users, eg. dog flea and tic control products, have no warnings

- c. Ornamental users are often unaware and unable to confirm products containing high levels of neonicotinoids. Prefect pansies purchased at the market can be neonic soil quenched without the buyer /residential gardens knowledge. Urban use transfers this chemical into out our urban and highly efficient water collection services. There are no impact studies on these issues to reflect on for information. We are all on uncharted waters.

A Typical Example of Urban Use



Flea and Tick Adulticide
Adulticide contre les puces et les tiques

KEEP OUT OF REACH OF CHILDREN
GARDER HORS DE LA PORTÉE DES ENFANTS

Once-A-Month Topical Flea and Tick Treatment
Traitement topique mensuel contre les puces et les tiques

Liquid
Liquide

FOR USE ONLY ON DOGS 11-25 KG
N°UTILISER QUE SUR LES CHIENS 11-25 KG

DO NOT USE ON CATS OR KITTENS
NE PAS UTILISER SUR LES CHATS OU CHATONS

DOMESTIC
DOMESTIQUE

READ THE LABEL AND INSERT BEFORE USING
LIRE L'ÉTIQUETTE ET LE FEUILLET D'EMBALLAGE AVANT L'EMPLOI

WARNING POISON AND EYE IRRITANT



AVERTISSEMENT : POISON ET IRRITANT POUR LES YEUX

TOXIC TO CATS



TOXIQUE POUR LES CHAT

GUARANTEE: Imidacloprid 8.8 %
Permethrin 44 %
GARANTIE: Imidaclopride 8,8 %
Perméthrine 44 %

REG. NO. 27660 P.C.P. ACT
N° D'ENR. 27660 LOI P.A.

NET CONTENTS: Four or Six 2.5 mL Tubes
CONTENU NET : Quatre ou Six tubes de 2,5 mL

8.8% = 88,000.

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Human Exposure to Imidacloprid from Dogs Treated with Advantage

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The objective of this investigation was twofold: (1) to determine the transferable residue of imidacloprid in gloves worn while petting experimental household dogs after the application of Advantage[®] and (2) to determine the imidacloprid residue in the dog's blood. Advantage[®] contains 9.1% imidacloprid, which controls fleas on dogs for up to 30 days. Imidacloprid produces toxicity by interacting with nicotinic receptors. Advantage[®] (364 mg imidacloprid/dog) was applied topically to six household dogs. The glove and blood samples were collected at 24 h, 72 h, and then on a weekly basis for 5 weeks post-Advantage[®] application. The glove samples were collected by petting each dog for 5 minutes while wearing a different glove per dog. The blood samples (5 mL from each dog) were collected into EDTA tubes. The imidacloprid residue was determined in the blood extracts and glove samples using RP-HPLC. The highest levels of imidacloprid residues were detected at the 24-h interval in both glove (254.16 ± 25.49 ppm) and blood (54.06 ± 3.00 ppb) samples. The blood imidacloprid residue was reduced by one third at the 72-h interval (18.73 ± 2.00 ppb) and was not detected after 1 week. Imidacloprid residue in the glove samples decreased approximately one third between each collection interval. The residue of imidacloprid in the glove extract by the fourth week was very low (0.08 ± 0.02 ppm) and not detected by the fifth week. The present findings suggest that following topical application of Advantage[®], imidacloprid residue can be detected in the dog's blood for up to 72 h, and transferable residue on the dog's coat can be detected for up to 4 weeks. Repeated chronic exposure

to imidacloprid may pose possible health risks to veterinarians, veterinary technologists, dog caretakers, and owners.

Keywords Imidacloprid, Advantage[®], Insecticide, Residue, Dogs, Blood Samples

INTRODUCTION

Imidacloprid was first discovered during the 1970s from a chemical group called nitromethylene (Arther et al. 1997). It is a chloronicotinyl insecticide that is registered for use on food crops, tobacco crops, turfs/soils, and termite control in buildings. It is produced by the Bayer Corporation and sold under various brand names such as Premise[®] (termiticide), Admire[®] (seed treatment), and Grub-exTM (grub control). Most recently, its use was expanded to include a 30-day flea preventative for dogs and cats sold as Advantage[®].

Imidacloprid is chemically known as 1-[6-chloro-3-pyridinyl)methyl]-N-nitro-2-imidazolidinimine (Lee et al. 2001). It has an empirical formula of $C_9H_{10}ClN_5O_2$ and a molecular weight of 255.7 (Budavari et al. 1996). In the physical form imidacloprid is a clear liquid with slight yellow color and a mild odor (Bayer Corporation 2002). Imidacloprid is readily soluble in organic solvents (methylene chloride, acetonitrile, methanol, etc.) and slightly soluble in water (0.51 g/L).

Advantage[®] is a topical preparation, which consists of 9.1% active ingredient imidacloprid (an insecticide) and 90.9% of unspecified inert ingredients. This product is applied directly to the skin above the shoulder blades at the base of the skull in dogs (weighing <21 lbs) and cats. For dogs weighing more than 21 lbs, the product is evenly applied to the skin above the shoulder blades at the base of the skull, in addition to the skin below the shoulder blades at the start of the animal's back, again in the

Received 1 July 2004; accepted 15 August 2004.

*Presented at the Annual Meeting of Society of Toxicology, March 20–25, 2004, Baltimore, MD. This work is a part of MS thesis (M.S. Craig) submitted to Murray State University.

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Non-Farm Insect Control Products

HALDIMAND NORFOLK BEEKEEPERS ASSOCIATION

 **HELP SAVE OUR BEES** 

PLEASE DON'T USE THESE INSECTICIDES
THEY CONTAIN
NEONICITIOIDS

Bayer Advanced 3-in-1 Insect, Disease, & Mite Control
Bayer Advanced 12 Month Tree & Shrub Insect Control
Bayer Advanced 12 Month Tree & Shrub Protect & Feed
Bayer Advanced Fruit, Citrus & Vegetable Insect Control
Bayer Advanced All-in-One Rose & Flower Care concentrate
DIY Tree Care Products Multi-Insect Killer
Ferti-lome 2-N-1 Systemic
Hi-Yield Systemic Insect Spray
Knockout Ready-To-Use Grub Killer
Monterey Once a Year Insect Control II
Ortho Bug B Gon Year-Long Tree & Shrub Insect Control
Ortho MAX Tree & Shrub Insect Control
Surrender Brand GrubZ Out
Bayer Advanced All-in-One Rose & Flower Care granules
Green Light Grub Control with Arena
Amdro Quick Kill Lawn & Landscape Insect Killer
Amdro Rose & Flower Care
Maxide Dual Action Insect Killer
Ortho Bug B Gon Garden Insect Killer
Ortho Bug B Gon for Lawns
Ortho Flower, Fruit and Vegetable Insect Killer
Ortho Rose and Flower Insect Killer
Ortho Rose Pride Insect Killer
Green Light Tree & Shrub Insect Control with Safari 2 G
Safari
Ortho Tree & Shrub Insect Control Plus Miracle Gro Plant Food

FOR MORE INFORMATION AND TO SIGN A PETITION
WWW.HALNORBEEKEEPERS.COM

Bayer adds bee language to consumer products.

March 10, 2015
No bee warning



April 10, 2015
With **bee** warning



Premise Plus Nature' Equals Value Added Termite Control

Premise® Insecticide, introduced by Bayer Corporation in 1996, works synergistically with nature to provide value-added termite control.

Premise Plus Nature,[™] the term the manufacturer uses to describe the product's unique mode of action, affects termites by making them susceptible to infection, disease and death by naturally occurring organisms.

HOW IT WORKS.

With Premise there are two modes of action at work. At moderate to high exposure levels, Premise causes termites to stop feeding, stop grooming, become disoriented and die. Premise Plus Nature takes over at lower exposure levels. Unlike contact mortality and repellent barrier termiticides, this unique mode of action puts Premise in a category all its own.

Like germs that cause illness and disease in humans, microorganisms, especially fungi naturally present in the soil, cause disease in termites. Fungal spores attach themselves to the termite cuticle, germinate, penetrate and eventually cause death. But thanks to Mother Nature, termites have found ways to survive in this hostile soil environment.

The termites' habit of grooming themselves and other termites in the colony is a principle part of their defense systems. This instinctive habit enables termites to virtually eliminate the threat of the fungi; termites remove the spores before they can germinate and cause disease.

Premise Plus Nature disrupts this natural defense process. After exposure to Premise, termites no longer groom themselves or take care of each other. Premise interferes with their methods of combating fungi and, in the end, they will succumb to disease and death.

"Grooming offers termites a shield to protect themselves. But when grooming stops and the shield is down, infection takes over," said David Price, a biologist at Bayer Corporation's Vero Beach, Fla., laboratory. ***"With Premise, termites don't get the chance to fight back."***

Bees under stress: sublethal doses of a neonicotinoid pesticide and pathogens interact to elevate honey bee mortality across the life cycle.



Microbial pathogens are thought to have a profound impact on insect populations. Honey bees are suffering from elevated colony losses in the northern hemisphere possibly because of a variety of emergent microbial pathogens, with which pesticides may interact to exacerbate their impacts. To reveal such potential interactions, we administered at sublethal and field realistic doses one neonicotinoid pesticide (thiacloprid) and two common microbial pathogens, the invasive microsporidian *Nosema ceranae* and black queen cell virus (BQCV), individually to larval and adult honey bees in the laboratory.

Wainfleet Bog Project

We want to manage farming which will increase biodiversity with our indicator species, the bobolink "the friend of farmers"

Farmers are the custodians of the land and can regenerate our biodiversity like no other group. We recognize this and are willing to devote dollars to this effort to make it offset the farm costs and to gain farmer participation. We are proud to work with farmers



Proposed Expansion



John Struger Report

Chemosphere 169 (2017) 516–523



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Chemosphere

journal homepage: www.elsevier.com/locate/chemosphere



Factors influencing the occurrence and distribution of neonicotinoid insecticides in surface waters of southern Ontario, Canada



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H I G H L I G H T S

- Conducted a survey of neonicotinoids used in full range of agricultural activities in surface waters of Ontario.
- Statistical correlation of individual compounds with land use was investigated.
- Relationship between neonicotinoid occurrence and hydrology of water courses was assessed.
- Imidacloprid, clothianidin, and thiamethoxam detection frequency over 90% at over half the sites sampled.
- At 2 sites, the Canadian freshwater guideline value for imidacloprid (230 ng/L) was exceeded in 75% of samples.

Niagara Honeybee Conservatory



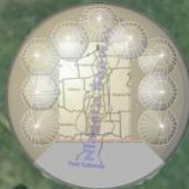
Lets put investments
into activity **we can all
be proud of.**

*concept building

Niagara Honeybee Conservatory

Devoted to Niagara Beekeeping

Located on Victoria Rd.,
Niagara Falls across from
the Great Wolf Lodge



A reason to make
Niagara a destination.

A seminar centre for
agricultural and local groups.



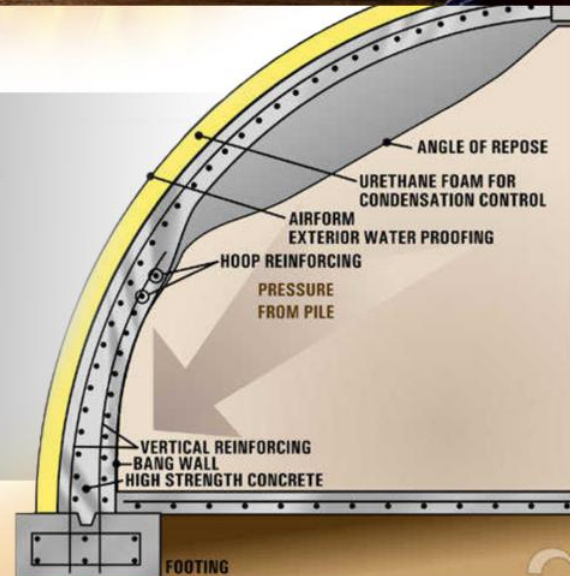
Niagara Honeybee Conservatory



Anticipated **200,000+** tourist visitors.

110 New Jobs!

**NIAGARA BEEWAY
Centre**



What are we doing in 2020?

1. Construct
the Niagara
Honeybee
Conservatory

3. Import
Carpathian
Genetics

2. Get the
Conservation
Authority to
identify neonic
concentrations

4. Continue
researching
improvements
for beekeepers

5. Advance
our
international
student
exchange

