2018 Aerial Spray

Frequently Asked Questions

What is defoliation?
Defoliation is the widespread loss of leaves on a tree(s).

What are fall cankerworms and gypsy moths?
Fall Cankerworm (*Alsophila pometaria*)
Fall cankerworms (also known as inchworms) are a native insect found throughout the majority of Canada. Fall cankerworms undergo natural population increases every 10 to 15 years that last for two to seven years, although usually no more than four. They feed on tree leaves from May through mid-June and then go underground to re-emerge in the late fall as moths. They are known to feed on apple, ash, beech, cherry, elm, hickory, oak and maple tree species.

Gypsy Moth (Lymantria dispar)
Gypsy moths are an invasive insect from Europe and Asia. Gypsy moth caterpillars feed on the leaves of oak and other deciduous trees. Caterpillars chew small holes or completely strip a tree of its leaves depending on its age and population. They are five to 60 millimetres long, dark and hairy with five pairs of blue dots and six pairs of red dots on the back.

How much damage can they cause?
High levels of fall cankerworm and gypsy moth caterpillars are causing many trees in Mississauga to experience severe loss of leaves, which could lead to weakness and make them more susceptible to diseases or weather fluctuations.

What does the damage look like?
Both fall cankerworm and gypsy moth caterpillars create small holes in the new leaves. As the caterpillars begin to grow, they eat more and the holes become larger until only the leaf veins remain. When population levels are high, both fall cankerworm and gypsy moth caterpillars have the ability to strip trees of all of their leaves.

What types of trees do these caterpillars affect?
They are known to feed on hardwood trees such as apple, ash, birch, cherry, elm, hickory, oak, willow and maple species. Other deciduous trees and even conifers such as pine or spruce could be susceptible when populations are high.

Why does it matter if trees lose a few leaves from hungry caterpillars?
Tree damage can range from light to severe defoliation. As the caterpillars grow, they consume more and more leaves. As the growth cycle winds down in late June, trees can look as if they have lost their leaves overnight. Under normal circumstances, defoliation caused by fall cankerworm and gypsy moth caterpillars won't kill a tree. Healthy trees should grow back their leaves two to three weeks after defoliation, or by early July depending on the year. However, their growth is slower and they are less able to fight potential new diseases and other insect attacks.

The urban tree canopy provides health, social, environmental, and ecological benefits to communities. Trees help to:

- Improve air quality and reduce smog and pollution
- Provide shade
- Reduce energy demand for cooling in summer (shades buildings) and heat in winter (windbreak)
- Reduce the negative effects from urban heat (reducing the 'heat island' effect by shading paved surfaces and provides water vapor that cools the air)

- Prevent flooding and reduce peak storm water run-off volumes
- Increase property values and aesthetics and strengthens communities
- improve emotional well-being and mental health (stress reduction)
- Increase outdoor activity and walkability, leading to improved health (e.g. cardiovascular)

Why are there so many fall cankerworms and gypsy moths in Mississauga?
Both pests have been present in Mississauga for a long time with their populations rising and falling. In 2006, an aerial spray was done to mitigate the high gypsy moth population. Since then, the City has monitored and managed pests for City-owned trees resulting in lower populations.

Where do fall cankerworm and gypsy moths come from?
Cankerworm is a native insect found throughout the majority of Canada. Gypsy moths are an invasive pest from Europe and Asia.

Why are they such a nuisance?
Besides defoliating trees, caterpillars can take over properties quickly. They tend to crawl everywhere including up the sides of homes, on outdoor toys, decks and patio furniture. They can become a nuisance fast. You can hear them munching on leaves and their droppings can cause a mess. Exposure to gypsy moth hairs, silken threads and shed skins can cause skin rashes and upper respiratory tract irritation in some people.

Do they have any natural predators?
Gypsy moths do have natural predators: a fungus – *Entomophaga maimaiga,* a virus - *Nucelopolyhedrosis* and a small wasp (*Encyrtidae* family). The fungus and virus require a cool wet spring to be effective. The wasp only kills eggs that are close to the surface of each egg mass and can't kill any of the eggs that are hidden beneath the outer surface eggs.

What is Integrated Pest Management (IPM)?
IPM focuses on the long-term prevention and mitigation of pests or their damage through techniques such as monitoring, biological control, habitat manipulation, modification of cultural practices and use of resistant varieties.

The City's Forestry section has had a full IPM program for gypsy moths since 2012. This includes egg mass surveys in the fall to predict defoliation levels for the following year and various control strategies.

What has the City been doing to manage fall cankerworm and gypsy moths?
The City has been implementing a number of control measures to manage fall cankerworm and gypsy moth populations. As part of these measures, egg masses are monitored every fall and winter season. Control measures include:

- wrapping trees in burlap (known as burlapping)
- applying sticky bands
- scraping egg mass
- putting up adult pheromone traps
- ground spray program using Btk

However, while these methods are effective, lately they haven't been able to keep the fall cankerworm or gypsy moth caterpillar populations at a level where there would be minimal impacts to the tree canopy.

What can residents do to help?
Residents can help by:

- Scraping egg masses off of trees and other hard surfaces and soak them in soapy water for a minimum of 48 hours
- Placing sticky bands on tree trunks
- Installing burlap skirts around tree trunks
- Destroying pupae
- Using pheromone traps

The City encourages these IPM techniques at different times:

- **September to April:** Scraping gypsy moth egg masses off of trees and other hard surfaces leaves, tree trunks and branches and soak them in soapy water for a minimum of 48 hours to destroy them
- **May to July and October to December: Tree Banding:** Placing sticky bands on tree trunks
- **May to September: Burlapping:** Install burlap wraps around tree trunks and then collect and destroy the caterpillars, pupae, adults, and egg masses
- **June to August: Pheromone Traps:** Use pheromone traps to catch and confuse adult male gypsy moths

Does the City inspect trees on private property?
The City does not inspect trees on private property.

What is tree banding? Why is it important?
Tree banding consists of commercially available double-sided sticky tapes, or sticky material such as Tanglefoot, which prevents cankerworm or gypsy moth caterpillars from crawling up the trunks of trees. These products are applied to the surface of duct tape or window sill insulation but not applied directly to the bark. Forestry staff do not recommend using petroleum-based products because these can cause injury (swelling and cankering) on thin-barked trees. The sticky bands do not need to be wider than 10 centimetres and should be monitored weekly to ensure they are continuing to form an effective barrier.

Where can residents buy the tree banding supplies?
Banding material can be purchased at most local hardware stores and garden centres around the city.

AERIAL SPRAY

Why is the City planning an aerial spray?
The City is facing a cankerworm and gypsy moth population problem that is affecting the Mississauga's tree canopy. Elevated levels of fall cankerworm and gypsy moths have caused severe defoliation of trees in certain areas of the city. This has led to potential impacts on the overall health of many hardwood trees on both City-owned and private property.

While the City will continue to implement ongoing IPM measures, it will also conduct an aerial spray in areas predicted for severe defoliation. Aerial spraying has proven to be very effective in lowering cankerworm and gypsy moth populations. Although the aerial spray won't eradicate all traces of fall cankerworm and gypsy moths, it will naturally lower populations to a more manageable level.

Which areas are being sprayed?
The spray will treat roughly 1,940 hectares (4,794 acres) of private and public land in Wards 1, 2, 6, 7, 8 and 11.

What type of pesticide is being used?
The City of Mississauga will be using *Bacillus thuringiensis* subspecies *kurstaki* (Btk), registered under the trade name of Foray® 48B. Btk is a naturally occurring bacteria found in soil. Btk is not a chemical. Btk has been successfully used by the City of Mississauga in 2006 and 2007 to control gypsy moth populations. Toronto, Oakville, and Hamilton have, or are, completing aerial spray programs using this compound as well.

What organisms does Btk pesticide affect?
Btk only works against organisms that go from egg to larvae to pupae to moth (lepidopterans). Btk does not affect adult moths and butterflies, including the monarch butterfly, as it is not in the caterpillar stage at this time of year. Btk does not affect other insects, honeybees, fish, birds or mammals.

How does Btk work?
Btk produces a protein that is toxic only to the larvae (caterpillars) of specific insect species. When ingested by susceptible insects, the toxic protein molecules destroy the walls of the insect's stomach. The insect usually dies within two to five days.

For Btk toxins to be activated, the alkaline conditions that exist only in certain insects' digestive systems must be

present. The acidic stomachs of humans and animals do not activate Btk toxins, which is why the pesticide is not toxic to humans and animals. Btk has been used in many countries without health impacts to individuals on medications or vulnerable populations.

What is the formulation (product)?
The formulation of Btk the City will be using, Foray® 48B, is comprised of three per cent actual bacteria, 75 per cent water and 22 per cent food grade inerts. The term 'food grade inerts' refers to a special blend of additives that give the formulation protection against ultraviolet light and help make it stick to foliage. They do not pose any health risks. Btk remains effective for approximately one to four days.

The pesticide is Foray® 48B Biological Insecticide Aqueous Suspension. It contains the active ingredient Btk. It is registered under the Pest Control Products Act (PCP # 24977)

What is the concentration of Btk?
A small amount of liquid covers a large area: four litres = one hectare (2.5 acres). Comprehensive spray drift modelling has been done to ensure accurate and effective application.

Who regulates Btk use in Canada?
Btk has been approved by the Pest Management Regulatory Agency, an agency of Health Canada, for aerial use over urban areas.

Is Btk safe?
Btk is an effective pesticide that has been shown to successfully manage cankerworm and gypsy moth populations. It has been extensively studied by Health Canada and the US Environmental Protection Agency (EPA). Research shows that Btk poses minimal risk to human health when used as directed.

Btk is approved by Health Canada for aerial use over urban areas. It has been used by many countries over the last 30 years, including Canada and the United States. The City of Mississauga used Btk in Mississauga in 2006 and 2007. Its use did not result in health impacts to the general population.

The public is unlikely to experience any symptoms and no special precautions are necessary or required. Btk aerial spraying is also not expected to have adverse effects on vulnerable populations including children with asthma, people with weakened immune systems, pregnant women or the elderly. However, infrequently there may be some residents who are more sensitive and experience skin, eye or respiratory irritation.

In addition to the Btk active ingredient, other ingredients called formulants have also been studied broadly and do not have any significant health risks. Formulants normally include water and other ingredients to make the product stick to leaves and needles of trees.

While the aerial spray will not eradicate cankerworm and gypsy moth population levels, it will reduce populations to more manageable level to protect trees. A related bacterium has been used to control mosquitos in surface water in Mississauga for over a decade as part of the efforts to protect against West Nile Virus. Btk has been successfully used by the City of Mississauga in 2006 and 2007 to control gypsy moth populations.

Research shows that Btk (used in aerial spray programs) has not shown to have any negative environmental effects. Once applied, Btk biodegrades quickly, approximately in one to four days, through exposure to sunlight and micro-organisms.

The urban tree canopy provides social, environmental, and ecological benefits to communities. Trees improve air quality and reduce smog and pollution, provide shade, reduce energy demand for cooling in summer and heat in winter, prevent flooding, and promote physical health (improves walkability, improves cardiovascular health).

Does Peel Public Health have any concerns about Btk use?
Peel Public Health is not anticipating human health impacts associated from Btk aerial spraying. We understand that the City of Mississauga is committed to administering the program in a manner consistent with provincial and federal regulations, guidelines and best practices.

What personal precautions can be taken for aerial spraying?
Members of the public are unlikely to experience any health effects and no special precautions are necessary or required. Individuals who have concerns should take reasonable precautions to avoid exposure during a spray program.

While no special precautions need to be taken, the following measures may be considered by residents living in the treatment area:

- Whenever possible, remaining indoors for 30 minutes after spraying to allow for the droplets to deposit onto the tree leaves.
- Bringing laundry, toys and pets indoors before spraying begins.
- Practicing good personal and food hygiene (e.g. hand washing after outdoor activities, especially after gardening; leave outdoor shoes at the door; washing all fruits and vegetables before eating or cooking).
- Covering lawn furniture, outdoor tables, pools, BBQs, play equipment and sandboxes and/or rinsing them off with water after spraying is finished.
- Minimizing opening and closing windows and doors during the spraying.
- Shutting off the heating/cooling vents or selecting the recirculate setting.
- Contacting your family physician if you are concerned that a personal medical condition may be aggravated by the spraying.

Does it pose a risk to residents who might have sensitivities?
Members of the public are unlikely to experience any symptoms and no special precautions are necessary or required. However, infrequently there may be some residents who are more sensitive and experience skin, eye or respiratory irritation. Btk aerial spraying is not expected to have adverse effects on vulnerable populations including children with asthma, people with weakened immune systems, pregnant women or the elderly.

What should I do if I experience an adverse reaction?
If you experience an adverse reaction or worsening or medical condition, speak to your physician or, in an emergency, call 9-1-1.

Can gypsy moths affect my health directly?
Extreme gypsy moth outbreaks have been associated with skin rashes and upper respiratory tract irritation in some people exposed to airborne gypsy moth hairs, silken threads, and shed skins.

It is recommended that residents avoid exposure to gypsy moth caterpillars. Children should be discouraged from playing with any gypsy moth caterpillars. The spiny hairs on the caterpillars can cause welts or a patchy rash that can persist for four to five days.

Can fall cankerworm affect my health?
No. While a potential nuisance, fall cankerworms do not impact human health.

Is Btk safe for animals?
According to Health Canada, Btk is only toxic in the caterpillar stage of the cankerworm and gypsy moth life cycle. Btk does not affect adult moths and butterflies, including the Monarch Butterfly, as it is not in the caterpillar stage at this time of year. Btk does not affect other insects, honeybees, fish, birds or mammals. There is also no impact on animals or pets if they are exposed to or ingest Btk.

Where does Btk go in the environment?
Research shows that Btk used in aerial spray programs has not been shown to have any negative environmental effects. Once applied, Btk biodegrades quickly, approximately 1-4 days, through exposure to sunlight and micro-

organisms. There are no groundwater contamination concerns, as Btk does not travel through the soil beyond 25 cm.

How long does Btk remain effective?
Btk is applied to leaves when caterpillars are feeding. It breaks down quickly (approximately one to four days) when exposed to sunlight and micro-organisms.

Is this the first time the City is doing an aerial spray?
In 2006 and 2007an aerial spray was done to mitigate the gypsy moth population. Since then, the City has monitored and managed pests on City-owned trees resulting in manageable populations.

Who is conducting the spray for the City?
Zimmer Air has been contracted to conduct the spray on behalf of the City. They are an experienced Ontario-based company who has done an aerial spray in Mississauga before. The City of Toronto conducted a spray last year and this year the Town of Oakville and the City of Hamilton will be doing it this year.

What areas are being sprayed?
The spray will treat areas of Mississauga predicted to see severe leaf loss from caterpillar feedings. The area is roughly 1,940 hectares (4,794 acres) of private and public land in Wards 1, 2, 6, 7, 8 and 11.

Is there a certain season or window of time the spray has to happen within?
The best time to apply Btk is late April or mid-May when caterpillars are small, hungry and feeding**.** The seasonal spray window is set for April 23 to June 10, 2018 between 5 and 7:30 a.m. The treatments will start around sunrise and will take approximately 2.5 hours to complete. Applications can occur any day of the week, including weekends. Once the leaves are a certain size, the caterpillars have reached almost 100% emergence and the caterpillars begin feeding, the spray window can be narrowed. Once it is determined that those factors are met, the weather conditions then need to be monitored.

The Btk application is weather dependent. Ideal application conditions consist of:

- calm winds (1-16 kph)
- high humidity (> 40%)
- temperatures between 2 and 25 degrees Celsius
- no precipitation within the spray window and for 24 to 48 hours after

What type of aircraft will conduct the spray?
For 2018, two helicopters with a spray system will fly about 15 metres above the treetops. It is anticipated to take three days to complete the application and there will be a total of two spray applications.

The spray zones were created using scientifically designed methods. Comprehensive spray drift modelling has been done to ensure accurate and effective application. All zones and their boundaries were critically reviewed by City staff, a consultant and Zimmer Air.

Why are only certain areas of Mississauga getting sprayed?
The spray zones were created using scientifically designed methods. Comprehensive spray drift modelling has been done to ensure accurate and effective application. All zones and their boundaries were critically reviewed by City staff, a consultant and Zimmer Air.

The spray zone areas we have defined have been developed on the basis of scientific data. Areas that are being sprayed are those where there is no other IPM control option available that would reduce the populations significantly enough to meet acceptable thresholds.

Areas predicted for severe defoliation, designated as ‘”high priority target areas for management”, were considered as critical areas which were included in the spray. The spray zones were developed using scientific data.

There are other areas in Mississauga that will experience cankerworm and gypsy moth populations. Integrated

Pest Management (IPM) control measures have proven effective to keep lower population levels in check for these areas.

What happens if the spray is cancelled?
Bad weather or wind may cause the aerial spray to be postponed with little-advanced notice. The City will issue a communication to the public 48 hours before each treatment and provide up-to-date information through 3-1-1 and online at mississauga.ca/2018spray. The spray may be cancelled up to 12 hours in advance if the weather conditions change.

If the weather isn't co-operative and spraying can't be done – what are the City's next steps?
The City will continue to monitor pest population levels and consider appropriate treatment methods.

Why is spraying from the air seen as more effective than spraying from the ground?
Evaluation of previous programs over the past few decades have shown that aerial sprays are highly effective for controlling fall cankerworm and gypsy moths. Large areas can be treated in just a few hours. Most droplets reach the ground within 10 minutes of application.

Aerial spraying can treat remote or difficult-to-access areas, providing even coverage throughout the target area. Also, the droplets can penetrate the crowns of even the tallest trees.

How is the City going to measure the success of the spray program?
There will be an onsite measurement of the deposit of the Btk following each aerial spray to evaluate the coverage and accuracy of the spray. Success will also be measured by evaluating tree health in July (if the trees are green and covered with leaves versus completely defoliated) and extensive egg mass counts in the fall.

Residents are encouraged to implement healthy tree practices and to consult with qualified arboricultural companies to develop healthy tree management plans for their trees.

If the spray isn't successful, what's next?
We will monitor immediately following the first spray to determine initial results and will readjust if required for the second spray. In the event that the second spray is also unsuccessful, we have the option for a third spray.

Will spraying become an annual thing?
We are confident this year's spray will be enough to bring the cankerworm and gypsy moth population numbers back down into the normal range. Spraying this spring is the best approach for the health of the trees, our environment, and residents.

We have committed to adding cankerworm monitoring to our yearly program, similar to gypsy moth and have identified the need to consider a spray on an approximate 8 year cycle. This would be refined by the monitoring program for the two insects and in relation to the threshold triggers that predict severe defoliation.

PREPARING FOR THE SPRAY

How will I know when the spray is happening?
In advance of the spray, the City will inform residents of the specific areas of the flight path, treatment plan and any other relevant information.

- Notification signs will be posted along local roads to announce the closures.
- Specific exit routes will be developed out of each spray zone area.
- Social media will be used to update the public on current spray operations. Follow @CityMississauga, @MississaugaPF and #2018AerialSpray on Twitter for these updates.
- The public is encouraged to sign up for email alerts regarding the spray at mississauga.ca/2018spray

- For questions or for up-to-date information about what you can do to control fall cankerworm and gypsy moths on your property, aerial spray details like road closures, spray dates, times and locations call 3-1-1 or visit mississauga.ca/2018spray, where you can also sign-up for email alerts.
- Residents with questions or concerns related to the health impacts of aerial spraying with Btk can call Region of Peel Public Health at 905-799-7700 or speak to their family physician

Should I cover items in my backyard?

It is recommended to cover things you don't want sprayed like patio furniture, outdoor tables, play equipment and sandboxes – rinse them off with water after spraying is finished**.** The spray does not damage paints or finishes on automobiles, houses, boats or trailers. If it is left to harden, the spray can be removed with water but may require more effort. The sooner it is washed off, the easier it is to remove.

Can my pool remain open?

If possible, cover pools during the spray period. After the spraying has been conducted and pool cover has been removed, consider testing the water to ensure balance in water chemistry prior to swimming in the pool. If the pool has not been covered during the spray, test the water to ensure balance in the water chemistry prior to swimming.

AFTER THE SPRAY

There is a film on my patio furniture, will it come off with water?

The spray does not damage paints or finishes on automobiles, houses, boats or trailers. If it is left to harden, the spray can be removed with water but may require more effort. The sooner it is washed off, the easier it is to remove.

Can I use my BBQ?

If possible, prior to the spraying, close and cover your BBQ or bring it into a covered area. BBQs left open or uncovered should be rinsed with water prior to use. If left to harden, it may require more effort to remove.

Is it safe to go swimming in my pool after the spray?

Btk biodegrades quickly through exposure to sunlight. If possible, cover pools during the spray period. After the spraying has been conducted and pool cover has been removed, consider testing the water to ensure balance in water chemistry prior to swimming in the pool. If the pool has not been covered during the spray, test the water for chemistry balance prior to swimming.

Can my dog be outside when the spray occurs? Is it harmful to pets?

Individuals who live in the treatment areas should bring pets indoors before spraying begins. This will reduce pets bringing Btk indoors. Btk is not considered a risk to pets or animals.

Where can residents get more information? What is the best way to stay informed?

For questions or for up-to-date information about what you can do to control fall cankerworm and gypsy moths on your property, aerial spray details like road closures, spray dates, times and locations call 3-1-1 or visit mississauga.ca/2018spray, where you can also sign-up for email alerts.

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