FAQ: *Lymantria dispar dispar* (LDD) Aerial Spray

What is *Lymantria dispar dispar* (LDD)?

LDD is a non-native invasive insect from Europe. During their caterpillar phase, LDD feed on the leaves of oak and other deciduous trees. Caterpillars chew small holes in leaves and can potentially decrease canopy leaf coverage. 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.

In an effort to use more inclusive language, the City of Mississauga, as well as counterparts in Canada and the United States began phasing out the use of the common name "Gypsy Moth" in 2021. The preferred alternative is to refer to the species by its scientific name*, Lymantria dispar dispar*, or 'LDD' for short. Most recently, the Entomological Society of Canada adopted the new common name of "Spongy Moth" for LDD. In order to be consistent with our communications in 2022, the city will continue to refer to the species as LDD.

How did LDD get here?

LDD was introduced to North America from Europe in 1869 in an attempt to develop a silkworm industry in the United States. In 1870, a small number of moths escaped, and, within 20 years, LDD had become a serious pest. Despite a quarantine in place since the early 1900s in the United States, LDD has been advancing slowly west-ward from the northeastern United States. LDD was first detected in Ontario in 1969 on Wolfe Island, south of the City of Kingston.

What types of trees do LDD caterpillars affect?

LDD 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 LDD populations are high.

How much damage can they cause?

High levels of LDD caterpillars can cause trees to experience a loss of leaves, which could lead to weakness and make them more susceptible to diseases or extreme weather events such as drought. Trees in urban settings may be increasingly susceptible to these impacts given the additional stresses they face including, soil compaction, restricted root volume, other pests, and human impacts.

Why does it matter if trees lose a few leaves from hungry caterpillars?

LDD caterpillars tend to only feed and damage trees for a short period in June and July. As the caterpillars grow, they consume more leaves, later in this period, trees can look as if they have lost their leaves overnight.

Healthy trees are able to grow back their leaves within the season. However, several years of defoliation weakens trees and can have negative impacts on long-term health. Trees that are already stressed by other pests, diseases or extreme weather events such as droughts may also be disproportionately impacted.

Why are trees so important?

Trees in Mississauga are essential to providing an array of 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)
- Provide habitat for birds and other wildlife in the city

Can LDD affect my health directly?

It is recommended that residents avoid exposure to LDD caterpillars. Children should be discouraged from playing with any LDD caterpillars. The spiny hairs on the caterpillars can cause welts or a patchy rash that can persist for four to five days. Residents experiencing symptoms are advised to contact a heath care professional for advice.

Can LDD ever go away?

LDD is firmly established in Mississauga, and across Southern Ontario. Eradication is not feasible. Management programs in Ontario, Canada and the United States are based on minimizing impacts, slowing the spread of the invasive insect but not eradication. Area containing host trees within the City of Mississauga will be periodically affected by LDD for the foreseeable future.

Aerial Spraying

What is aerial spraying?

Aerial spraying involves spraying an area of tree canopy a compound containing a substance called *Bacillus thuringiensis* subspecies *kurstaki* (Btk)from the air using a double engine helicopter. When employed, this work is completed by a contractor working for the City.

When does it occur?

There is a very narrow window in which the aerial application of Btk will be most effective against LDD. Treatment is restricted to the late spring when LDD caterpillars are present in their earliest stages (instars) and when leaves are present on the tree so that there is a surface area on which to apply the product. Although this means the timing can change each year depending on the caterpillar hatch and leaf emergence, generally this occurs during mid-May and early June. Typically, two rounds of spray are applied, depending on the efficacy of the first spray.

How effective is an aerial spray?

Aerial Spraying for LDD aims to reduce defoliation levels in targeted areas to reduce impacts on tree health and vigour. Aerial sprays are used as a mechanism to provide annual control until such a time as the natural controls for LDD (the fungus (*Entomophaga maimaiga*) and virus (nucleopolyhedrosis or NPV) contribute to a larger, population level collapse.

What should residents do the day of the spray?

The City is committed to ensuring all possible steps are taken to keep Mississauga healthy and habitable for all residents. The safety and health of residents and the protection of the environment are top priorities. The public may hear helicopter noises during the early morning. All necessary safety precautions are taken to ensure minimal risk to the public, staff and the applicators.

Most residents are unlikely to experience any symptoms if exposed. A small percentage of sensitive residents may experience skin, eye, or respiratory irritation. To minimize exposure, stay indoors during the spray and for 30 minutes following the spray to allow the droplets to settle.

Before the spray:

- close windows
- turn off fans or air conditioners, or select the recirculate setting
- bring in laundry and toys
- cover all vegetable and herb gardens
- keep pets indoors
- cover pools, BBQs, play equipment, lawn furniture and automobiles

After the spray:

- wash/rinse pool covers BBQs, play equipment, lawn furniture and automobiles with water
- practice 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)
- wash pets' paws before entering the home

Residents with any concerns or questions about health and the use of Btk can call Peel Public Health at 905-799-7700 or speak to their family doctor.

What should I do with my pet?

Btk is not considered a risk to pets. However, to limit exposure, we recommend that pets be brought indoors during the time of the spray and, after the spray, washing their paws when entering the home after being outside.

Health

What is Btk?

Bacillus thuringiensis subspecies *kurstaki (*Btk), is a naturally occurring bacterium found in soil and a substance used frequently in organic agriculture to manage LDD populations. It comes in many different proprietary formats depending on the use and circumstance. Btk is an effective pesticide that has been shown to successfully manage LDD 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. For more information on Btk, consult the fact sheet provided by Health Canada.

Is Btk safe for wildlife?

According to Health Canada, Btk is only toxic in the caterpillar stage of the LDD life cycle and does not affect other insects, honeybees, fish, birds or mammals. Btk does not affect adult moths and butterflies (Lepidopterans).

However, because Btk is non-selective it can impact other early-season caterpillars which may be feeding on trees at the time of the spray, and are an important source of food for many birds and other wildlife. However, the risks of not spraying include:

- A reduction or loss of food available to early season caterpillars from severe defoliation caused by LDD;
- A reduction in the nutritional content of second-flush leaves in areas defoliated by LDD which are the food sources for caterpillars that emerge later in the summer;
- Increased susceptibility of trees defoliated by LDD to disease, extreme weather events and death which will further limit habitat and resources for butterfly and moth species in the future.

The city screens the proposed aerial spray areas for butterfly and moth species at risk and does not spray in areas where they may be found, with the exception of the Monarch butterfly, whose caterpillars have limited overlap with the area and the timing of the aerial spray.

How does Btk affect the environment?

Once applied, Btk biodegrades quickly in approximately 1-4 days through exposure to sunlight and microorganisms. There are no groundwater contamination concerns, as Btk does not travel through the soil beyond 25 cm.

Who can I speak to about Btk?

Residents with questions or concerns related to the health impacts of aerial spraying with Btk can call Peel Public Health at 905-799-7700 or speak to their family physician.

Egg Mass Removal

What is egg mass removal?

Egg mass removal involves scraping LDD egg masses from any surface where they are found. The eggs are placed in a bucket of soapy water for a minimum of 48 hours to kill the eggs before being disposed of. This activity can take place any time after eggs are laid, but typically occurs in the fall and winter months.

Does the City undertake egg mass removal?

The City undertakes targeted LDD egg mass removal during the winter months. Egg mass removal is determined on a tree-by-tree basis, and is targeted to younger/smaller trees in high-risk areas so that staff are able to reach egg masses along the entire tree. Egg mass removal in large trees is not undertaken given the limited ability of staff to reach into the tree canopy rendering the activity ineffective for control.

Burlap Banding

What is burlap banding and why/how is it effective?

Burlap banding involves the wrapping of a particular tree with a band of burlap cloth forming a skirt. During the heat of the day, LDD caterpillars will crawl under the burlap seeking shade. Concentrated in this way, they can be easily picked off a tree and otherwise destroyed. Installing burlap on trees is an effective, low-cost strategy that can be undertaken on a small scale by homeowners to reduce LDD populations on private trees given that there is more opportunity to check the burlap and destroy caterpillars on a regular basis.

Pheromone Traps

What is a pheromone trap used for?

A pheromone trap is a device used to capture adult male moths. The trap contains a lure that has a chemical that attracts the male moths. Pheromone traps are primarily used as monitoring tools to detect the presence of LDD and its spread. It is particularly useful in monitoring new areas for infestation where other signs of LDD (i.e.: egg masses) are more difficult to discern given the low abundance.

Common Public Concerns

Where are the 2022 aerial spray zones?

Residents can learn which areas are included in the 2022 aerial spray by visiting mississauga.ca/2022spray. There they can access an interactive map of the city showing all the areas to be treated in 2022. Residents can also access a direct link to the map by clicking here. The map allows one to see the extent of the spray and to zoom into particular areas of interest like a home or place of work.

How do I receive 48-hour notification of spray dates?

The City will provide public notification 48 hours before each spray treatment. To stay informed:

- Visit mississauga.ca/2022spray frequently for project updates and to subscribe to receive email news alerts
- Check our interactive map (available at mississauga.ca/2022spray) for updates
- Follow @citymississauga and @saugaparksrec on social media
- Call 311 (905-615-4311 if outside Mississauga) or email us at public.info@mississauga.ca. Collect calls will be accepted.

How does the City determine treatment options?

The city's Integrated Pest Management (IPM) program considers many options for LDD treatment: aerial spraying, ground spraying, individual tree injection, burlap banding, and egg mass scraping. Each year, treatment options for LDD are determined following a robust monitoring program that is undertaken the previous winter by city staff and consultants. A number of factors are considered when determining treatment options to ensure that the significant resources required to treat trees and woodlands are expended only where there is a high likelihood of success and where the potential impacts on the tree/woodland health from not treating it are high. These factors include:

- the predicted risk of defoliation to a tree or woodland area
- the sensitivity of the tree or woodland area to the effects of defoliation (e.g.: size of tree, species of tree, and the number of years it has been predicted to have experienced defoliation).
- the current and predicted state of the LDD outbreak cycle
- compounding stressors affecting a tree or woodland health (e.g. major storms, tree diseases, etc.).
- the ability to access the tree/woodland for particular treatment types (e.g.: the height of the trees, the location of roads to allow for equipment access, etc.)

It is important to recognize that the LDD IPM program is adaptive. Modifications to management criteria may occur to address situations where other stressors are present that

may predispose trees to mortality or where particularly high value/specimen trees are present.

How can a resident report a LDD sighting?

Sightings of LDD can be reported via the City's online LDD Reporting Form. This form allows residents to input the details of their observations including quantities observed, life stage observed (i.e. caterpillar vs. adult moth vs. egg mass) and allows them to upload a photo of their observation. These observations will then populate an interactive map showing all observations in the city. Forestry staff will use this information for tracking LDD populations in the city and the information will inform our yearly monitoring and treatment program.

Will the City remove LDD egg masses/caterpillars from my home or private property?

No. The responsibility for removing egg masses or caterpillars from private property rests with the property owner.

Will the City provide free materials for LDD control on private property?

Most materials necessary for LDD control such as burlap are low cost items that can be purchased from local hardware stores, garden centres and nature stores across the city. There are also many DIY options in the event that materials are not available to purchase in store. For example, old bed sheets can be substituted for burlap wrapping, and water bottles can be substituted for pheromone traps. The City is working on a plan to distribute a limited amount of LDD supplies to residents in affected areas. Check our website for more details throughout the LDD season.

What can residents do on their own property to help combat LDD?

MAY - AUGUST:

- Install burlap bands around trees to collect and concentrate LDD caterpillars. Caterpillars will crawl under the burlap to find shade during the day, and can also pupate in the burlap. Check all layers of the burlap once daily and place the LDD in a bucket of soapy water for a minimum of 48 hours.

- Caterpillars can be handpicked from trees and other areas and placed in a bucket of soapy water for 48 hours.
- Btk can be purchased from local garden centres, hardware stores and farm supply stores and be applied to trees of concern by following the instructions of the manufacturer.
- Homeowners can contact a licenced tree care company to discuss chemical treatment options. Some products have very specific timing windows in order to be successful.
- Help reduce tree stress and preserve tree health by watering and mulching trees in periods of drought.

SEPTEMBER–APRIL:

- Scrape egg masses from all surfaces (e.g. trees, sheds, eaves troughs) and place a bucket of soapy water for a minimum of 48 hours. Remove burlap skirt and pheromone traps and exterminate attached egg masses by soaking the burlap in a bucket of soapy water for a minimum of 48 hours.

What resources does the City provide to landowners?

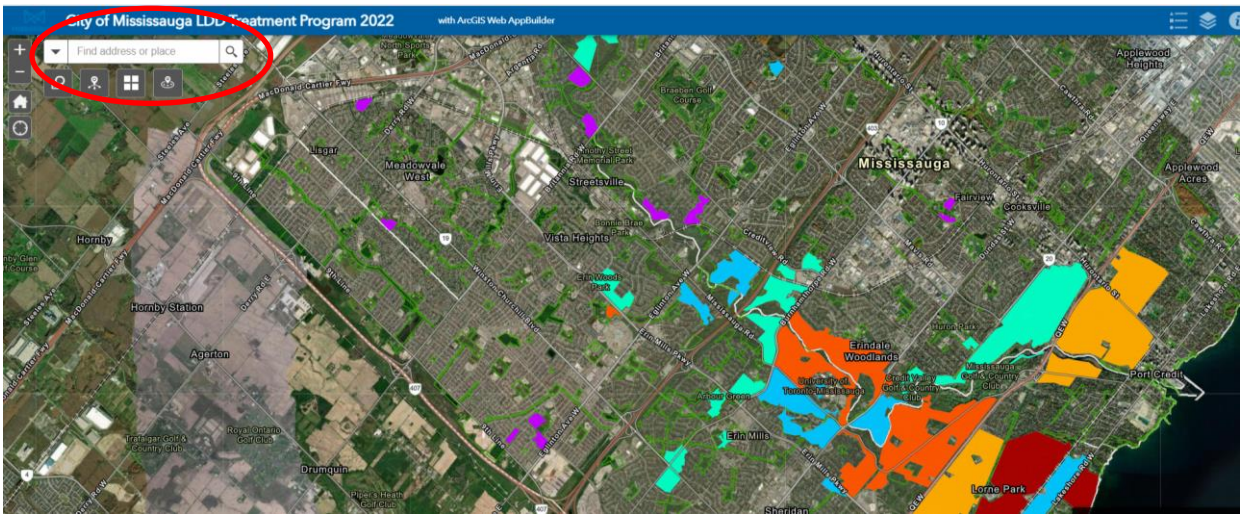
- Instructional information on website (https://www.mississauga.ca/services-and-programs/forestry-and-environment/invasive-species/gypsy-moth/)
- Residents can sign up for news alerts through the website that inform them of the City's programming and actions they can take on private property.

- During treatment season, postcards are mailed to affected neighbourhoods informing them of treatment.
- An online reporting tool and interactive map allowing them to submit and view observations of LDD that help inform the City's monitoring efforts.
- An online treatment map showing the specific locations for the aerial spray and other treatments and their status (completed/in progress).
- FAQ document available through the website.

How do I use the Interactive Map?

Visit Mississauga.ca/2022spray

- Click our interactive map button
- Use the "+" and/or "-" button in the top left hand side of the screen to zoom in an out of the map
- Enter a specific address in the "Find Address or Place" box on the top left to zoom into a particular area of interest to you like your home, work, or school to see if it within a spray zone.



- The map contains a legend that automatically appears on the right hand side of the screen. The following information is displayed:
    - LDD Aerial Spray Treatment Zones 2022 (spray areas)
    - Park Boundaries
    - Ward Boundaries