

## Delaware Forest Service Spring 2024 Proposed Spongy (formerly known as Gypsy) Moth Spray Program

In response to increased levels of leaf-eating caterpillars of the spongy moth (formerly named gypsy moth, latin name: *Lymantria dispar dispar*) in southern Sussex County in the last two years, the Delaware Forest Service is proposing a one-time aerial application of bio-rational insecticides to thirteen pre-selected neighborhoods in the spring of 2024. Ground surveys for spongy moth egg masses were conducted by the Delaware Forest Service in the late summer of 2023 to determine which areas are at risk for additional spring 2024 caterpillar outbreaks. The selected neighborhoods are around the Cypress Swamp and the Phillips Landing Road/Nanticoke State Wildlife Area. The proposed spray areas total about 670 acres in these 13 residential neighborhoods (see attached list). Landowners are being contacted by individual letters and will have the option to refuse the spray for their property. The dates for the spray depend on spring leaf development, larval development, and forecasted weather, however, typical dates are from about April 15 to May 15. This is a no-cost, voluntary spray that will utilize one of three bio-rational insecticides depending on location, weather, and insect development stage. These insecticides are: “dimilin”, “mimic”, or *Bacillus thuringiensis kurstaki* (Btk). Only one of the three products would be sprayed in a selected area. Information and neighborhood spray updates will also be recorded on the spray program hotline number: (302) 698-4619.

Please Contact the Delaware Forest Service Forest Health Specialist at (302) 698-4553, or leave a message at the above hotline number if you **do not** live in one of the Sussex County neighborhoods listed below, and suspect you have fresh spongy moth egg masses at your residence or woodlands.

### UPDATES:

- Spongy moth is in the egg mass stage at this time. Delaware Forest Service will begin monitoring for egg hatch some time in late March when accumulated growing degree days approach 90.
- Neighborhood residents are being sent a notification letter the week of January 8<sup>th</sup>, 2024 with information and details about how to contact the Delaware Forest Service to opt out of the no-cost spray.

The leaf-eating larvae are found from mid April to early June (figure 1), but are more apparent in the later stages. Pupal cases are formed in mid June. Adult moths are found from late June to August. Female moths lay fresh egg masses mostly in July and August (figure 2). Prior years egg masses look faded and often tattered (bottom of figure 3). Only fresh egg masses (top of figure 3) are a source of larvae for the following spring.



Figure 1: Spongy Moth fully developed larvae.

Credit: <https://www.scriver.org/gypsy-moth-an-unwelcome-start-to-summer/>



Figure 2: Spongy Moth female adult laying an egg mass which might have about 50 to 500 eggs.

Credit: <https://pikeconservation.org/programs-services/spongy-moth/>



Figure 3. Newly laid Spongy Moth egg mass at top; previous year's egg mass at bottom (NO viable eggs).

Credit: <https://bygl.osu.edu/node/499>

Proposed sprays with owner opt-outs after March 22 DEADLINE				
Name	aveeggmassperacre	original acres	# opt outs	Acres opted- out
Philips Landing Estates	320	59		
River Road	307	100.1	4	2
White Owl and Mill Creek	250	127.4	2	1.7
Bethel Road	240	64.7		
Nine Foot Road	800	19.1	2	8
Fox Chase Farm	360	36.7		
Molly Field Road	400	77.1		
Winter and Summer	240	60.4	2	2.3
Catmans Road (west)	250	18		
McCabe Development	250	30.1	2	1.75
Catmans Road (east)	250	7.3		
Moore Street Park	620	110.4		
Cherry Walk Woods	250	36.4	3	2.08
		746.7		17.83

## **GYPSY MOTH B.T. FACT SHEET**

### **Fact Sheet on the Biological Insecticide Bacillus thuringiensis var. kurstaki**

#### **What is Bacillus thuringiensis?**

Bacillus thuringiensis, or B.t., is a spore-forming bacterium that occurs naturally in the environment. Spores are highly resistant bacterial cells that are formed in response to environmental conditions. During the process of spore formation, the bacterium also produces crystalline bodies that contain delta-endotoxin, which is a natural substance toxic to certain lepidopteran (butterflies and moths) caterpillars. B.t. is effective for control of gypsy moth and many other forest and agriculture insect pests.

#### **How does B.t. work?**

B.t. is a biological insecticide that attacks the digestive tracts of caterpillars. Caterpillars do not die from being sprayed with B.t., or by coming into contact with treated surfaces. The spores and crystals must be eaten before they can act. Shortly after ingestion, the crystals are broken down by the highly alkaline (pH=9) digestive system of the caterpillar. This causes the release of the toxin. Within one to two hours, the toxin ruptures the cells in the gut wall and causes the caterpillar to stop feeding. Bacterial cells in the gut can now contaminate the blood of the caterpillar through the ruptured gut wall. Once in the blood, the bacterial cells multiply, causing the death of the caterpillar in seven to ten days. Susceptibility to B.t. is generally dependent on the species, size, and age of the caterpillar, with smaller gypsy moth caterpillars being more susceptible. Larger caterpillars often survive ingesting B.t. and continue to feed and develop.

#### **Is B.t. safe to beneficial and non-target insects?**

B.t. is safe to use around beneficial insects, such as honeybees, gypsy moth parasites and predators, and ladybugs. The only non-target organisms that might be affected are other leaf-eating lepidopteran caterpillars present at the time of application. Since susceptibility to B.t. varies from one species to another, the effects on these other organisms could range from no effect to mortality, depending on the susceptibility. Those lepidopteran species that are not feeding in the forest canopy for the few days that B.t. is active are physically removed from any possible effects.

### **How effective is B.t.?**

B.t. works best on small gypsy moth caterpillars (5/8 inch in length or smaller), so the earlier B.t. is applied after egg hatch, the more effective it will be. B.t. provides the best foliage protection when used to treat gypsy moth populations of 1,000 egg masses per acre or less. B.t. is easily rendered ineffective by sunlight, so its effectiveness lasts for only 3 to 10 days. More than one application may be needed if egg hatch is prolonged over a long time. In Delaware, egg mass density reduction can average between 50 % and 90% during any given year. Defoliation damage is typically kept to less than 30% of the tree's foliage, but results are strongly influenced by the weather conditions at the time of application. Cold temperatures and rain can reduce the effectiveness of B.t.

### **Is B.t. safe to the environment?**

B.t. is the most environmentally safe insecticide commercially available for gypsy moth control. Numerous studies over the past 20 years have shown that B.t. has no adverse effects on humans, animals, fish, birds, or other organisms. This lack of toxicity has caused the U.S. Environmental Protection Agency to exempt B.t. from any residue tolerance requirements on raw agricultural commodities. B.t. spray-drops on cars will wash off easily and will not spot the finish.

## GYPSY MOTH DIMILIN® FACT SHEET

### **What is Dimilin®?**

It is a trade name for the chemical insecticide also known as diflubenzuron. Dimilin® is distributed in the United States by Uniroyal Chemical Company, Inc. This insecticide is registered for use in forests and residential areas for gypsy moth suppression. It is also labeled for control of forest tent caterpillar, Nantucket pine tip moth, tussock moths, boll weevil, armyworms on cotton, foliar insects on soybeans, and certain flies on mushrooms.

### **How does Dimilin® work?**

Dimilin® is an insect growth regulator, meaning it affects the insect's growth process. Dimilin® inhibits the formation of chitin, which is a main structural component of the outer skin of gypsy moths and most other insects. An insect's skin structure is greatly weakened without the presence of chitin. As a gypsy moth caterpillar grows, it periodically molts, shedding the old skin as it grows. If the caterpillar has eaten Dimilin®, the new skin will not form properly. This new skin is weakened and cannot withstand the increased internal pressure during molting. The old skin will not properly shed and the caterpillar dies before reaching the next stage of development. Since adult insects do not molt, they are not affected by Dimilin®.

### **Is Dimilin® safe to beneficial and non-target insects?**

Dimilin® is safe to use around beneficial parasites and predators of the gypsy moth, as well as honeybees. If beneficial insects are adults at the time of application, they will not be affected by Dimilin®. Studies have shown that honeybees flying in and around areas sprayed with Dimilin® were unaffected by the spray. Everything from honey production, to egg production by the queen, to brood development and survival were monitored, with no effects found. Dimilin® can affect other leaf-eating moth and butterfly caterpillars, grasshoppers, some parasitic wasps, some spiders, some sawflies, some aquatic insects, and some bottom dwelling and free-floating crustaceans. Birds and bats may switch diets and expand their foraging territories to adapt to a change in preferred food availability.

### **How effective is Dimilin®?**

Dimilin® does not break down in sunlight or wash off the leaf surfaces very readily in the rain. It will remain on the leaf surface for 30 or more days during the growing season. Gypsy moth egg mass density reduction of 90% or more can be expected. It has been the pesticide of choice in many state and federal cooperative gypsy moth spray programs because of its effectiveness in reducing gypsy moth populations during high egg mass density years, and for its ability to protect tree foliage with minimal environmental effects. Dimilin® has been used in cooperative state and federal programs for gypsy moth control in New York, Pennsylvania, Maryland, Ohio, North Carolina, Virginia, Tennessee, West Virginia, and Delaware.

### *What can I expect after Dimilin® is applied*

Dimilin® works best on smaller caterpillars. Gypsy moth caterpillars are most susceptible immediately after they hatch. The earlier Dimilin® can be applied, the more effective it will be. The caterpillars **will not** drop out of the trees immediately after spraying. They will continue feeding and consuming large amounts of leaves until the next molt cycle takes place. The molting cycle will be disrupted by the lack of chitin formation in the outer skin layer and they soon die.

### *Is Dimilin® safe to the environment?*

Studies have shown that a single application of Dimilin® in the forest environment has no impact on mammals, birds, or fish. It does not accumulate in the food chain and has no significant impact on aquatic organisms, though, if applied directly to water Dimilin® can affect aquatic invertebrate organisms. For this reason, Dimilin® is not applied within 200 feet of open bodies of water in the Delaware Suppression Program, though the EPA label for Dimilin lists a 150-foot restriction for natural bodies of water. Even though it is persistent on leaf foliage, it breaks down rapidly in the presence of soil and water. Once in the soil, it does not leach readily. Dimilin® at the dose being applied, is not a skin irritant, nor does it irritate the eyes. Tests have shown that it is low in both acute and chronic toxicity and does not cause cancer. Dimilin® is a restricted-use insecticide, meaning that only licensed commercial applicators can purchase and apply this insecticide.