

FACT SHEET

Bacillus thuringiensis var. *kurstaki*, (*B.t.k.*) Used in the Gypsy Moth Aerial Spray Program

The New Jersey Department of Agriculture will again be offering to participating municipalities the biological insecticide *Bacillus thuringiensis* var. *kurstaki*, (*B.t.k.*) in the 2016 Gypsy Moth Cooperative Suppression Program.

TOXICOLOGY

B.t.k. is among the least toxic insecticides for use in residential areas to control the gypsy moth. Its active ingredient is a bacterium, which occurs naturally in the environment. *B.t.k.* has a high specific mode of action in controlling caterpillars and has shown no toxicity to mammals, fish or other wildlife at the recommended field rates. However, those individuals wishing a near zero exposure to themselves or their children during the spray operation, should stay indoors for at least 10–20 minutes, or use an umbrella to intercept the fine spray mist outdoors when the aircraft passes.

BIOLOGICAL EFFECTIVENESS

B.t.k. must be ingested by the gypsy moth caterpillar to be effective; therefore, larval mortality is not immediate and may take up to ten days for mortality to occur. Generally, the new dosage rates of *B.t.k.* used by the Department of Agriculture provide good foliage protection and population control. However, proper timing is critical since the larger caterpillars are harder to kill, therefore, extensive shutdowns, for any reason, could reduce the effectiveness of the pesticide.

ECONOMIC FEASIBILITY

B.t.k. will be applied at a dose of 38 B.I.U.'s (64 oz.) per acre by aircraft. The cost of aerial treatments varies between \$50.00-\$65.00 per acre depending on the dosage rate, geographical location and size of the treatment blocks. The New Jersey Department of Agriculture and the local municipality are currently sharing this cost. Only spray programs utilizing New Jersey Department of Agriculture prescribed insecticides and under State supervision are eligible for these cost-sharing funds.

ENVIRONMENTAL EFFECTS

B.t.k. has a residual life of less than 10 days and has little or no impact on non-target organisms. *B.t.k.* residues do not present a hazard, and sprays can be applied near water or over garden crops without causing adverse effects.

**MOST COMMONLY ASKED QUESTIONS ABOUT THE
NEW JERSEY COOPERATIVE GYPSY MOTH SUPPRESSION PROGRAM**

Q: Why is the Department involved in gypsy moth control programs?

A: The gypsy moth, in its caterpillar stage, is the most destructive hardwood defoliator ever to occur in New Jersey. Each year, since 1970, gypsy moth caterpillars have caused varying degrees of defoliation (leaf loss) between 1,910 - 800,000 acres of forest land. Study plots established in repeatedly defoliated forests show oak tree mortality varying between 15 to 65 percent.

Q: How does the control program work?

A: Municipalities with heavy infestations of gypsy moths, as delineated by a summer aerial defoliation survey, are contacted in writing by the Department in early fall, and asked if they wish to have a gypsy moth egg mass count. This is done to determine if the infestation will continue and what areas qualify for the spray program. If the residential or recreational forest has an average of more than 500 egg masses per acre, and is at least 50 acres in size it may qualify for participation in the cooperative gypsy moth suppression program. Municipal participation in the aerial spray program is completely voluntary.

In addition to delineating treatment areas, the Department also applies for U.S.D.A. Forest Service cost sharing funds which, if approved, results in up to 50 percent reimbursement of the treatment cost for the participating municipalities. The Department is also responsible for choosing the insecticide to be sprayed and in supervising the actual spray operation.

Q: What is the name of the insecticide used in the treatment program, and how does it work?

A: The biological insecticide used in the gypsy moth spray program is named *Bacillus thuringiensis*, *B.t.* It is a highly selective bacterium that when eaten by the gypsy moth caterpillar, enters the stomach, and rapidly multiplies causing a paralysis of the stomach wall which stops the caterpillar from feeding. Death usually occurs within 5 to 7 days. The insecticide is most effective against the smaller caterpillars so proper timing of the spray is extremely important to get the best results.

Q: Why aren't chemical insecticides being used in the Department's gypsy moth spray program?

A: Chemical insecticides may adversely affect beneficial insects, such as honeybees and/or aquatic insects, *B.t.* however does not. This biological insecticide only affects leaf feeding insects and is considered safe for people and pets. For this reason, the Department strictly uses this material in its Gypsy Moth Spray Program. This materials use has greater acceptance by the public because of this low toxicity toward non-target organisms especially in highly residential areas. It does not provide the same degree of caterpillar reduction as the chemical insecticides, but in more than 70 percent of the cases, satisfactory foliage protection is obtained. This protection is sufficient to prevent tree mortality and thus fulfills the Department's primary objective.

Q: Is there any alternative to spraying?

A: The New Jersey Department of Agriculture is recognized as a leader in promoting the use of biological control measures against a variety of agricultural and forest pests. For many years the Department reared and released millions of parasites and predators of the gypsy moth in order to establish a means of natural control. In some regions of the state, these parasites and predators have worked very well in stabilizing gypsy moth populations for many years. By selectively spraying only residential and recreational area, (treating only a small portion of the entire infestation), we are allowing these natural predators and parasites every opportunity to control the growth of gypsy moth populations. However, where epidemic numbers of the gypsy moth exist, the natural enemies cannot prevent heavy defoliation, in these areas, aerial sprays are recommended on a selective basis. Various mechanical control measures, such as egg mass removal or adult moth trapping may have some value at low population levels (less than 10 egg masses per acre) but have little effect when populations are high (520 egg masses per acre or more).

Q: What do gypsy moth caterpillars like to feed on?

A: The gypsy moth feeds on a wide variety of trees, which include oak, maple, birch, beech, willow, and hickory. The larger caterpillars also have been known to feed on pine, spruce, hemlock and many common ornamentals. Trees that are rarely attacked by the gypsy moth larvae include tulip poplar, ash, dogwood, rhododendron and cedar.

Q: What causes increases and decreases in gypsy moth populations?

A: The gypsy moth first began defoliating New Jersey forests in 1966. Three major population cycles have occurred, one in 1972 when 256,000 acres were defoliated, another in 1981 when 798,000 acres were defoliated, and another in 1990 when 431,000 acres were defoliated.

A cycle is completed when after years of steady build-up, the larval populations peak and dramatically crash the following season. This is caused by starvation, along with fungal and viral outbreaks, which have reduced populations from 80 to 90 percent in certain areas. Parasites and predators also help to keep gypsy moth populations at low levels in conjunction with these fungal and viral outbreaks. These periods of stable low gypsy moth populations may last for five years or more.

Q: What can a homeowner do to be included in the Department's Cooperative Gypsy Moth Suppression Program?

A: Since there are certain legal and fiscal requirements for participation in the aerial spray program, the Department can only work with local municipal governments. However, when a municipality requests an egg mass survey, we send Department inspectors to the municipal building to pick up a map and request locations of complaints of gypsy moth damage. The homeowner can play an active role in this process by requesting that your municipal officials ask the Department for a gypsy moth egg mass survey and filing a written complaint about the location of these gypsy moth infestations with your municipality by early September. Follow up this letter with another request in late December to determine if your area was indeed included in a spray block and if your municipality is participating in the cooperative program.

If your area contains high populations of the gypsy moth and your municipality either decided not to participate in the voluntary program, or your area did not qualify for the program (because of insufficient acreage), you may contact private spray applicators to have your area sprayed during early spring. The best time to spray for gypsy moth caterpillar control is in early May (from May 5-31), depending on the insecticide to be used and the larval development. In general, the caterpillars should be about ½ inch long and the foliage should be at least 1/3 grown when sprays are to be applied. If you decide to treat your own property for gypsy moth control be sure to use only those insecticides labeled for the control of gypsy moths and follow the directions on the label carefully.