

Draft
ENVIRONMENTAL ASSESSMENT
FOR
AERIAL APPLICATION OF PESTICIDE
FOR GYPSY MOTH CONTROL

U.S. NATIONAL ARBORETUM
DISTRICT OF COLUMBIA

3501 New York Av NE
Washington, DC 20002

ENVIRONMENTAL ASSESSMENT ORGANIZATION

DOCUMENT OVERVIEW

This Environmental Assessment (EA) addresses the aerial control of gypsy moth at U.S. National Arboretum (USNA), District of Columbia (DC). The EA is prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended, and in accordance with: Title 40, Code of Federal Regulations (CFR), Part 1500-1508, Council on Environmental Quality; all applicable policies and procedures of the U.S. Department of Agriculture and Agricultural Research Service and the USNA Pesticide Policy Manual.

The SUMMARY briefly describes the need for proposed action, location, relevant Federal statutes, alternatives considered, and the preferred alternative.

- Section 1 PURPOSE AND NEED FOR ACTION, provides the background for this action and outlines objectives and decisions to be made.
- Section 2 DESCRIPTION OF THE PROPOSED ACTION, describes the aerial application of pesticides for gypsy moth control.
- Section 3 ALTERNATIVES CONSIDERED, discusses the preferred implementation action and alternatives.
- Section 4 AFFECTED ENVIRONMENT, presents the environmental setting of the US National Arboretum and adjacent area.
- Section 5 ENVIRONMENTAL CONSEQUENCES, covers the potential direct environmental effects of the control action and describes planned mitigation actions.
- Section 6 IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES, identifies the tangible costs of the proposed action.
- Section 7 CONCLUSION, presents what was determined after examining the best currently available information.
- Section 8 PUBLIC PARTICIPATION, describes measures taken to inform and involve the public of the control action.
- Section 9 AGENCIES AND PERSONS CONSULTED, provides a list of people and agencies that provided information to the preparers of this report.
- Section 10 PREPARERS, identifies the people who prepared or contributed to the report, and their affiliations.

| | |
|------------|---|
| Section 11 | REFERENCES, provides bibliographical information for sources cited in the text of the report. |
| Section 12 | ACRONYMS AND ABBREVIATIONS |
| Appendix A | Vicinity Map |
| Appendix B | Dimilin® Pesticide Label |
| Appendix C | Dimilin® Material Safety Data Sheets |
| Appendix D | Finding of No Significant Impact |

DRAFT

SUMMARY

This Environmental Assessment (EA) addresses the aerial control of gypsy moth at the U.S. National Arboretum (USNA), District of Columbia (DC). The EA is prepared in compliance with the National Environmental Policy Act of 1969, as amended, and in accordance with: Title 40, CFR Part 1500-1508, Council on Environmental Quality; all applicable policies and procedures of the U.S. Department of Agriculture and Agricultural Research Service and the USNA Pesticide Policy Manual.

Gypsy moth defoliation of hardwood trees, including many oak species, was observed during an aerial survey in June 2007 by US Forest Service Forester Rodney Whiteman. In addition, an egg mass survey conducted in October 2007, indicated that a very high population of gypsy moth can be expected this spring 2008. Repeated defoliation of those trees damaged in 2007 and new defoliation of drought-stressed trees, with a predicted rate of up to 84 percent defoliation, could lead to the mortality of numerous trees in the areas of risk (see map, page 3) that includes Hickey Hill, Mount Hamilton, and woodlands in the Fern Valley Native Plant Collection.

The four alternatives considered are:

- 1) No action
- 2) One aerial application of diflubenzuron (DFB or Dimilin®) at the rate of 1.0 oz formulated material in a total mix of 1 gallon per acre (Proposed Action).
- 3) Two aerial applications of *Bacillus thuringiensis kurstaki*, (*Btk*), as in alternative 2, applied 4-7 days apart.
- 4) Two aerial applications of Gypchek at the rate of 2×10^{11} OBs in a total mix of 1 gallon per acre, applied 3-5 days apart.

The environmental consequences of each alternative are discussed in relation to identified major issues and concerns associated with the aerial application of pesticides. Environmental, health, and safety risks associated with the proposed alternatives are discussed. Mitigating measures that address specific concerns are offered. Selection of the treatment method is addressed in the Finding of No Significant Impact (FONSI).

TABLE OF CONTENTS

| Section | Page |
|--|-------------|
| 1. PURPOSE AND NEED FOR ACTION..... | 1 |
| 1.1 INTRODUCTION..... | 1 |
| 1.2 DECISION TO BE MADE..... | 1 |
| 1.3 RELATIONSHIP TO OTHER DECISIONS..... | 1 |
| 1.4 PROJECT OBJECTIVES..... | 1 |
| 1.5 ISSUES AND CONCERNS..... | 2 |
| 2. DESCRIPTION OF THE PROPOSED ACTION..... | 4 |
| 2.1 TREATMENT SITE AND ACREAGE..... | 4 |
| 2.2 BIOLOGICAL EVALUATIONS AND DECISION MAKING CRITERIA..... | 4 |
| 2.3 FACTORS DETERMINING IF AND WHEN TO TREAT..... | 4 |
| 2.4 TREATMENT METHOD..... | 5 |
| 3. ALTERNATIVES CONSIDERED..... | 6 |
| 3.1 PROCESS USED TO FORMULATE ALTERNATIVES..... | 6 |
| 3.2 ALTERNATIVES ELIMINATED FROM DETAILED STUDIES..... | 6 |
| 3.3 DESCRIPTION OF ALTERNATIVES CONSIDERED..... | 6 |
| 4. AFFECTED ENVIRONMENT..... | 8 |
| 4.1 GEOMORPHOLOGY AND PHYSIOGRAPHY..... | 8 |
| 4.2 LAND USE..... | 8 |
| 4.3 METEOROLOGICAL AND CLIMATOLOGICAL SETTING..... | 9 |
| 4.4 DEMOGRAPHICS..... | 9 |
| 4.5 NON-TARGET ORGANISMS..... | 9 |
| 4.6 THREATENED/ENDANGERED SPECIES..... | 10 |
| 5. ENVIRONMENTAL CONSEQUENCES..... | 10 |
| 5.1 BIOLOGICAL AND PHYSICAL CONSEQUENCES BY ALTERNATIVE..... | 10 |
| 5.2 CONSEQUENCES RELATING TO HUMAN HEALTH AND SAFETY..... | 11 |
| 5.3 CONSEQUENCES RELATING TO AIR QUALITY..... | 11 |
| 5.4 CONSEQUENCES RELATING TO WATER QUALITY..... | 11 |
| 5.5 EFFECTS OF NOISE..... | 12 |
| 5.6 SUMMARY..... | 12 |
| 5.7 MITIGATING MEASURES THAT APPLY TO ALTERNATIVES..... | 12 |
| 5.7.1 Aerial Application Precautionary Measures..... | 12 |
| 5.7.2 Environmental Precautionary Measures..... | 12 |
| 5.7.3 Human Health Precautionary Measures..... | 13 |
| 6. IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES..... | 14 |
| 7. CONCLUSION..... | 14 |
| 8. PUBLIC PARTICIPATION..... | 14 |
| 8.1 PUBLIC INVOLVEMENT..... | 14 |
| 8.2 PUBLIC NOTIFICATION..... | 14 |
| 9. AGENCIES AND PERSONS CONSULTED..... | 15 |
| 10. LIST OF PREPARERS..... | 15 |
| 11. REFERENCES..... | 16 |
| 11.1 REGULATIONS AND LAWS..... | 16 |
| 11.2 LITERATURE CITED..... | 16 |

12. ACRONYMS AND ABBREVIATIONS16

APPENDICES

- A. Vicinity Map
- B. Product Labels for Dimilin®
- C. Material Safety Data Sheets for Dimilin®
- D. FONSI

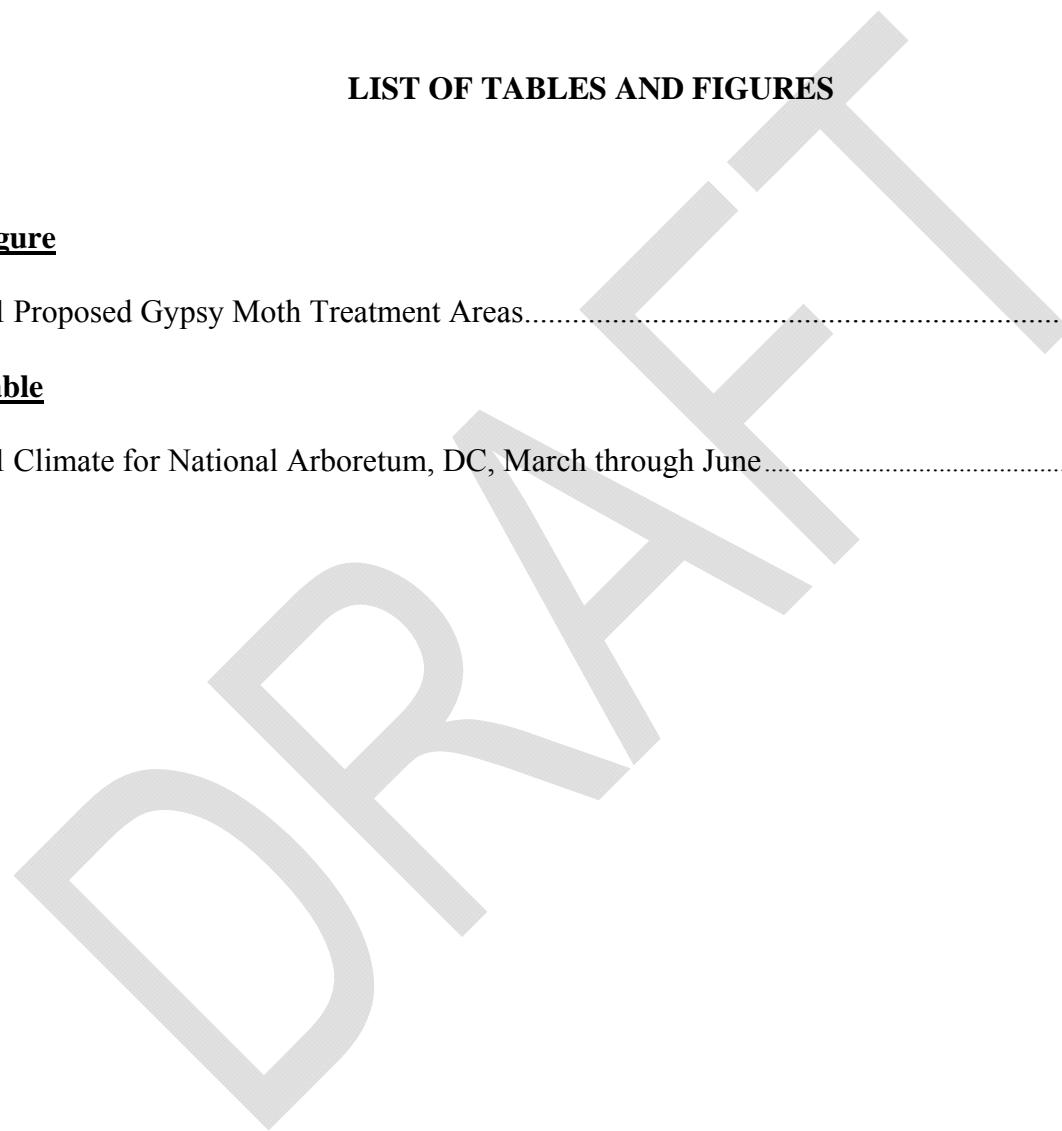
LIST OF TABLES AND FIGURES

Figure

1-1 Proposed Gypsy Moth Treatment Areas 3

Table

4-1 Climate for National Arboretum, DC, March through June10



SECTION 1 - PURPOSE AND NEED FOR ACTION

1.1. INTRODUCTION

This Environmental Assessment (EA) addresses the aerial control of gypsy moth at US National Arboretum (USNA), District of Columbia (DC). The EA is prepared in compliance with the National Environmental Policy Act of 1969, as amended, and in accordance with: Title 40, CFR Part 1500-1508, Council on Environmental Quality; all applicable policies and procedures of the U.S. Department of Agriculture and Agricultural Research Service and the USNA Pesticide Policy Manual.

The National Arboretum observed defoliated hardwood trees in the woodland areas of the arboretum and requested the US Forest Service to do a field survey to determine cause and make recommendations. US Forest Service Forester Rodney L. Whiteman conducted the survey in October 2007, and determined gypsy moth eggs masses at alarming levels. He concluded that current populations are sufficient to cause heavy defoliation on 200 acres in 2008, and recommended an aerial application of **Dimilin®** to prevent repeated defoliation and tree mortality (see map, page 3).

The Purpose of and Need for Action is to minimize the defoliation and mortality of native hardwood trees, as well as dozens of other genera of trees contained within the affected area by quickly and comprehensively reducing the gypsy moth population during the larval stage before much damage can occur. This Action will maintain healthy trees in woodland areas of the arboretum, preserve the environmental and aesthetic values of these trees, and avoid the significant cost of removing dead trees and replacing them.

1.2 DECISIONS TO BE MADE

The decisions to be made are whether or not to aerially treat gypsy moth populations located on U.S. National Arboretum campus, and what product to use. The official who is responsible for making this decision is: Dr. Thomas Elias, Director, U.S. National Arboretum.

1.3 RELATIONSHIP TO OTHER DECISIONS

This proposed action should be considered within the context of any other integrated pest management (IPM) activities directed toward gypsy moth at U.S. National Arboretum.

1.4 PROJECT OBJECTIVES

The primary objective of this project is to reduce the potential defoliation and resulting mortality of native and ornamental trees at the National Arboretum caused by gypsy moth activity in 2008. By implementing the proposed action, we expect to limit individual crown defoliation to 20 percent or less and reduce gypsy moth populations by at least 80 percent. These treatment objectives would be evaluated by aerial defoliation surveys and post-treatment egg mass surveys.

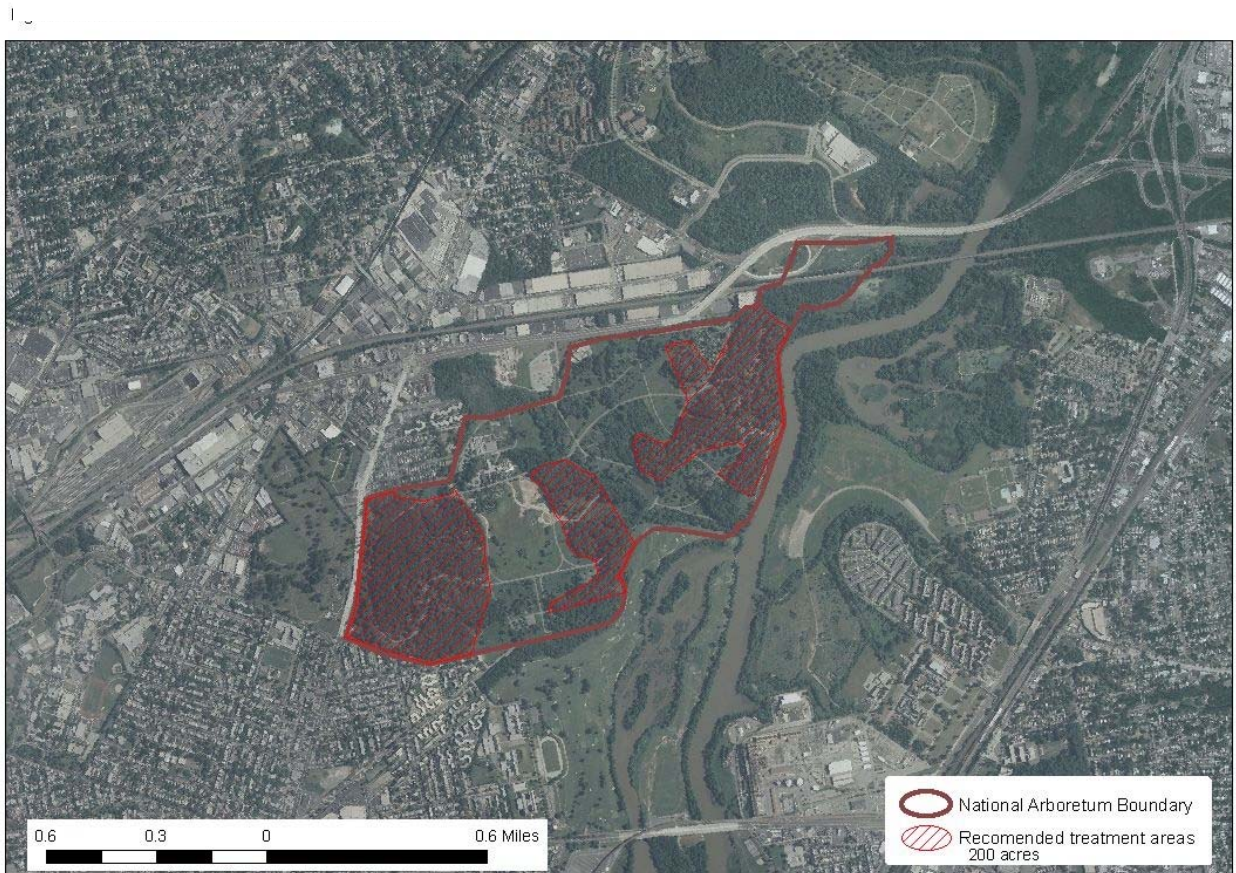
1.5 ISSUES AND CONCERNS

Issues and concerns were presented during discussions with National Arboretum personnel and other concerned individuals. The key issues and concerns are:

1. Is the method of pesticide application safe?
2. Are there health risks associated with exposure to the treatment material?
3. How will the treatment affect beneficial insects and wildlife?

Pertinent information relating to these issues and concerns is presented in Section 5, Environmental Consequences.

Figure 1. Proposed Gypsy Moth Treatment Areas at the National Arboretum.



SECTION 2 - DESCRIPTION OF PROPOSED ACTION

2.1 TREATMENT SITE AND ACREAGE

The proposed area to be treated by aerial application to minimize the defoliation of trees by gypsy moths is 200 acres in three areas, Hickey Hill, Mount Hamilton and Fern Valley Native Plant area.

2.2 BIOLOGICAL EVALUATIONS AND DECISION MAKING CRITERIA

In order to determine the seasonal need and timing for the proposed treatment several organizations need to be consulted. Aerial spray determinations are based upon the regional tree infestation attributable to gypsy moth and the gypsy moth population potential as influenced by observed egg mass densities during the survey by the US Forest Service in October 2007. Representatives from the following organizations have been and will be consulted to determine the need for spraying:

USDA ARS USNA
(Integrated Pest Management, *Christopher Carley*)

USDA Forest Service
(Forest Health Protection, *Rodney Whiteman*)

Andrews AFB, Environmental Flight
(316 CES/CEVP; *Patricia Gray*)

Communication between organizations is through formal meetings and through informal telephone contact. Pertinent biological information is exchanged weekly during the gypsy moth season. The decision to treat must be a collective process derived by using IPM principles and consulting all representatives that have gypsy moth and tree management responsibilities for the National Arboretum. A consensus recommendation involving all organizations is then passed on to the appropriate National Arboretum staff in charge of the application. Aerial application would take place once the egg masses have hatched in late April or early May.

2.3. FACTORS DETERMINING WHEN TO TREAT

Gypsy moth egg hatch is weather dependent and likely to occur during mid-April. Treatment would take place when the foliage expansion on oak trees is at least 30% and 10% of the gypsy moth larvae have reached the second instar. The aerial spray contractor would be contacted at least three days before treatment is to commence. Factors influencing when the actual spraying occurs are:

- (A) WIND VELOCITY – wind velocity must be 10 mph or less when measured in or near the spray block with a hand held wind gauge.
- (B) PROBABILITY OF PRECIPITATION – Probability of precipitation within six hours after the completion of spraying must be 50 percent or less.
- (C) RELATIVE HUMIDITY– relative humidity must be greater than 50 percent.
- (D) AIR TEMPERATURE – Air temperature in the shade at approximately 5 feet above the ground must be 40° F - 80° F.
- (E) WET FOLIAGE – Foliage must not be dripping wet either from precipitation or overnight dew.

2.4 TREATMENT METHOD

An aerial spray contractor with helicopter capability would follow Differentially Corrected Global Positioning System (DGPS) coordinates to ensure that all of the treatment area is covered and to avoid non-treatment areas to a tolerance of plus or minus ten percent of the area. A 200 foot buffer zone will be maintained around any open water areas.

2.5 TREATMENT MATERIALS

Dimilin® (diflubenzuron) is the most widely used chemical insecticide in gypsy moth suppression projects in the U.S. and is registered by the EPA for use in residential areas. Diflubenzuron (DFB) is an insect growth regulator that disrupts the normal molting processes of the larvae. The mode of action is to inhibit the formation of chitin, a necessary component of the outer cuticle which causes the affected larvae to die during the molt following treatment. The method of uptake is primarily by ingestion; however some research has indicated the possibility of absorption through the cuticle as well. DFB is relatively persistent on foliage (24 days) which increases the efficacy on gypsy moth populations but also exposes non-target insects, particularly caterpillars, for a greater period of time.

DFB is extremely toxic to some aquatic invertebrates and the label prohibits the application over open water or wetlands, except aerial application to a forest canopy. DFB is available as an oil based liquid formulation (Dimilin® 4L) and is normally applied in a single application at the standard rate of 0.5-2 ounces of formulated material per acre. With proper application, foliage protection and a significant population reduction can be expected. The need for treatment of residual populations the following year is normally not necessary.

See Appendices B and C for product labels and Material Safety Data Sheets.

SECTION 3 - ALTERNATIVES CONSIDERED

3.1 PROCESS USED TO FORMULATE ALTERNATIVES

Best pest management practices and industry-accepted methodologies were considered in the formulation of alternatives. The USDA Forest Service Northeastern Area State and Private Forestry Forester, who completed the survey in Fall 2007, recommended alternative treatment methods in the Biological Evaluation (Whiteman, 2007) that met the Purpose and Need. These alternatives were considered by the National Arboretum and adopted, in part. All recommended alternatives were aerially-based spraying as the industry standard. Alternatives that were not aerially based were also considered.

3.2 ALTERNATIVES ELIMINATED FROM DETAILED STUDIES

Two aerial spray alternatives were considered but eliminated from detailed study because they fail to meet the treatment objectives. One application only of either *Bacillus thuringiensis kurstaki* (*Btk*) or Gypchek would not be effective in reducing gypsy moth populations and protecting host tree foliage.

3.3 DESCRIPTION OF ALTERNATIVES CONSIDERED

Alternative 1: No Action

Under this scenario, no action to control gypsy moths would take place. Gypsy moth population levels would only be influenced by natural forces. Defoliation rates are predicted to be as high as 84%.

Alternative 2: Proposed Action—Dimilin®

One aerial application of diflubenzuron (DFB or Dimilin®) at the rate of 1.0 oz formulated material in a total mix of 1 gallon per acre. A helicopter would apply the insecticide when the eggs have hatched and the larvae have begun feeding, when leaf development is at least 30%, when the weather conditions are within the parameters specified in Section 2.3. The actual time of application would take about one hour.

Dimilin® is the most widely used chemical insecticide in gypsy moth suppression projects in the U.S. and is registered by the EPA for use in residential areas. **Dimilin**® is an insect growth regulator that disrupts the normal molting processes of the larvae. The mode of action is to inhibit the formation chitin, a necessary component of the outer cuticle which causes the affected larvae to die during the molt following treatment. The

method of uptake is primarily by ingestion, however some research has indicated the possibility of absorption through the cuticle as well. **Dimilin**® is relatively persistent on foliage (24 days) which increases the efficacy on gypsy moth populations but also exposes non-target insects, particularly caterpillars, for a greater period of time.

Dimilin® is extremely toxic to some aquatic invertebrates and the label prohibits the application over open water or wetlands, except the aerial spraying of a forest canopy. **Dimilin**® is available as an oil based liquid formulation (Dimilin® 4L) and is normally applied in a single application at the standard rate of 0.5-2 ounces of formulated material per acre. With proper application, foliage protection and a significant population reduction can be expected. The need for treatment of residual populations the following year is normally not necessary.

Alternative 3: *Bacillus thuringiensis kurstaki* (*Btk*)

Two aerial applications of *Btk*, similar to alternative 2, applied 4-7 days apart.

The only biological insecticide currently registered and commercially available for gypsy moth control is the microbial insecticide *Bacillus thuringiensis kurstaki* (*Btk*). This insecticide is available through several manufacturers and has been used extensively in suppression projects throughout the U.S. in both forested and residential areas. *Btk* is a bacterium that acts specifically against lepidopterous larvae as a stomach poison and therefore must be ingested. The major mode of action is by mid-gut paralysis which occurs soon after feeding. This results in a cessation of feeding, and death by starvation. *Btk* is persistent on foliage for about 7-10 days.

Btk formulations are available as flowable concentrates, wettable powders, and emulsifiable suspensions. The normal application rates range from 24-36 billion international units (BIUs) per acre. *Btk* can be applied either undiluted or mixed with water for a total volume of 0.5 -1 gallon per acre. With proper application, both foliage protection and a greater degree of population reduction are likely.

Because *Btk* is a biological insecticide, the degree of population reduction varies and may depend on, at least in part, the selected application rate, relative health of the population (building vs. declining), population densities, weather (rain and temperature), the feeding activity of the larvae following treatment, and the actual potency of the product.

Btk does affect other caterpillar species that are actively feeding during the treatment period.

Alternative 4: Gypchek

Two aerial applications of Gypchek at the rate of 2×10^{11} OBs in a total mix of 1 gallon per acre, applied 3-5 days apart.

A second microbial insecticide that is registered and available in limited quantities is the formulated nucleopolyhedrosis virus called Gypchek. This product is not available commercially but is produced in limited quantities by a cooperative effort of the USDA Forest Service and the Animal Plant Health Inspection Service (APHIS). The active ingredient in Gypchek formulations has a very narrow host range (lymantriids only) and occurs naturally in gypsy moth populations. Lymantriids are dull-colored moths whose larvae have tufts of hair on the body and feed on the leaves of many trees. Examples are gypsy moths, tussock moths, buck moths and brown-tail moths.

Normally the virus reaches epizootic proportions when gypsy moth populations reach high densities as a result of increased transmission within and between gypsy moth generations. The application of Gypchek to gypsy moth populations simply expedites this process by increasing the exposure to the virus at an earlier stage. Healthy, feeding gypsy moth caterpillars become infected by ingesting contaminated foliage and soon stop feeding and die.

The efficacy of Gypchek treatments to reduce gypsy moth populations has been quite variable. Because of the short period of viral activity on foliage (3-5 days) as well as other biological factors such as feeding activity and weather conditions, it has been difficult at best to project treatment efficacy. Most often foliage protection can be achieved but significant reductions in gypsy moth densities do not always occur. Should inadequate population reduction occur, areas would need to be treated again the following year.

The normal application rate of Gypchek is 2×10^{11} occlusion bodies (OBs) per acre applied in a double application. Due to the limited supply, priority is first given to state and federal cooperators that need to deal with federally listed threatened and endangered species associated with gypsy moth treatments. There are, however, sufficient quantities of Gypchek currently available for 2008.

SECTION 4 - AFFECTED ENVIRONMENT

4.1 GEOMORPHOLOGY AND PHYSIOGRAPHY

The US National Arboretum occupies 446 acres in the northeast section of the District of Columbia. The topography at the Arboretum is composed of rolling land with relatively few level fields between the higher elevations. The southwest part of the grounds is dominated by Mount Hamilton (elv 239 ft), most of which is covered by native woodland. The east central portion is dominated by Hickey Hill, which overlooks the Anacostia River to the east.

4.2 LAND USE

The major land use of National Arboretum comprises of cultivated gardens, approximately 160 acres, and native woodlands, approximately 150 acres. Almost 50 additional acres are meadow areas and research fields.

4.3 METEOROLOGICAL AND CLIMATOLOGICAL SETTING

The arboretum is located in the temperate continental climatic zone, a region of seasonally varying temperature and moderate year-round precipitation. In general, the period of heaviest precipitation is April through August when most thunderstorms occur.

The average annual temperature for the National Arboretum is 56°F. Monthly mean temperatures vary from 33.5°F in January to 78°F in July. A summary of the National Arboretum climatic data from the Air Weather Service (AWS) for the months of March through June when the gypsy moth growth can occur is given in Table 4-1.

Table 4-1: Climate for US National Arboretum, DC, March through June

| Month | Mean Temperature (F) | | | Monthly Precipitation (in.) | | |
|-------|----------------------|------------|---------|-----------------------------|-------|------|
| | Daily Max. | Daily Min. | Monthly | Mean | Max. | Min. |
| March | 55.3 | 33.4 | 44.4 | 3.92 | 6.62 | 0.99 |
| April | 66.0 | 42.2 | 54.1 | 3.26 | 8.79 | 0.18 |
| May | 75.8 | 52.4 | 64.1 | 4.29 | 11.32 | 0.87 |
| June | 84.4 | 61.8 | 73.1 | 4.21 | 10.54 | 0.46 |

4.4 DEMOGRAPHICS

The U.S. National Arboretum is bordered by residential neighborhoods on the west side, as well as the southwest side. There are no permanent residents within the property of the National Arboretum. Treatments will be made early in the morning hours when the arboretum is closed to the public. Treatment is expected to take less than one hour.

4.5 NON-TARGET ORGANISMS

Non-target organisms are those plants and animals, including insects that are susceptible to the alternative insecticides being considered. People, pets, birds, mammals, and reptiles, though present in the affected area, are not susceptible to these EPA-approved insecticides, as long as there applied according to the label.

Dimilin® is extremely toxic to some aquatic invertebrates and the label prohibits the application over open water or wetlands, except the aerial spraying of a forest canopy. A 200 foot buffer area is planned for all areas near open water.

Btk has been shown to impact other non-target caterpillars that are actively feeding at the time of treatment.

The active ingredient in Gypchek formulations has a very narrow host range (lymantriids).

4.6 THREATENED/ENDANGERED SPECIES

4.6.1. Animals

District Department of the Environment has determined there are no endangered species within the boundaries of the U.S. National Arboretum.

4.6.2. Plants

District Department of the Environment has determined there are no native endangered species within the boundaries of the U.S. National Arboretum.

SECTION 5 - ENVIRONMENTAL CONSEQUENCES

5.1 BIOLOGICAL AND PHYSICAL CONSEQUENCES BY ALTERNATIVE

Alternative 1 - No Action

Under this alternative, no use of insecticides to control gypsy moths would occur. If no action is taken this spring to control the gypsy moth population, defoliation of native hardwoods as well as several dozen genera of ornamental trees will likely occur. Trees defoliated last year are weakened by the loss of their leaves and the drought that occurred in the area and are likely to die from another defoliation episode. Trees not defoliated last year are also weakened by the drought and may die from defoliation this coming summer by an increasing population of gypsy moths. Many coniferous trees will die after one defoliation episode. The loss of these trees will diminish the environmental and aesthetic benefits of the trees, and force the National Arboretum to expend funds to remove the dead trees and replace them.

Alternative 2 – Proposed Action – Dimilin®

With the aerial application of Dimilin® the gypsy moth larval population would be substantially reduced, thereby minimizing the defoliation of trees and maximizing their chance for survival. Some trees may succumb to last year's drought and defoliation, but not likely if normal precipitation occurs. The impact to non-target organisms would be minimal since open water would be avoided, as required by the label. A 200 foot buffer zone will be established for any open waterways.

Alternative 3 – *Bacillus thuringiensis kurstaki* (Btk)

With the two aerial applications of *Btk* the gypsy moth larval population would be substantially reduced, thereby minimizing the defoliation of hardwood trees and maximizing their chance for survival. Some trees may succumb to last year's drought and defoliation, but this is not likely if normal precipitation occurs.

Btk has been shown to impact other non-target caterpillars that are actively feeding at the time of treatment. An example of the potential impacts is provided by a study conducted by Miller (1990) in Oregon and Samples, et al., (1996) in West Virginia. Miller's study involved a large scale (5,000 acres) eradication program where three consecutive applications of *Btk* were applied within a single season. On Garry oak, Miller found that species richness was significantly reduced in treated areas during all 3 years of the study while the total number of immature native Lepidoptera rebounded after the second year. In the Sample study, the areas treated with *Btk* were 50 acre plots and only a single treatment was applied. Here too, both species richness and the total numbers of native macro-lepidopterous caterpillars and adults were reduced but only for less than 1 year. The difference in duration of the impacts between these studies is probably the result of the number of treatment applications applied and the size of the treatment area involved.

Alternative 4 – Gypchek

With the two aerial applications of Gypchek the gypsy moth larval population would likely be substantially reduced, although the efficacy could be quite variable. This alternative may be effective at minimizing the defoliation of hardwood trees and maximizing their chance for survival, or not, depending on variables discussed Section 3.3, Alternative 4, page 6. Some trees may succumb to last year's drought and defoliation, but this is not likely if normal precipitation occurs. Some non-target lymantriids would likely be affected but only temporarily.

5.2 CONSEQUENCES RELATING TO HUMAN HEALTH AND SAFETY

There would be no anticipated impact to human health and safety by any of the alternatives.

5.3 CONSEQUENCES RELATING TO AIR QUALITY

The incremental increase in air particulates and engine emissions over that generated by mission activities would be minor and of short duration.

5.4 CONSEQUENCES RELATING TO WATER QUALITY

As per label requirements, open water would be avoided to the maximum extent possibly using helicopters and DGPS. Drift would be minimized by the requirement that the wind speed at the

time of spraying is 10 mph or less. A buffer zone of 200 feet will be established near any open water.

5.5 EFFECTS OF NOISE

The incremental increase in noise over that generated by mission activities would be minor and of short duration.

5.6 SUMMARY

In summary, based upon currently available information, the proposed use of Dimilin®, *B.t.k.*, or Gypchek should not significantly impact wildlife and non-target organisms due to these materials' target specificity, mode of action, low persistence, rapid biodegradability, and limited numbers of applications.

5.7 MITIGATING MEASURES THAT APPLY TO ALTERNATIVES

5.7.1 Aerial Application Precautionary Measures

Every effort would be made during the course of this project to conduct a safe and effective program. The operation would be announced to local residents through District of Columbia Advisory Neighborhood Commission 5B, 2100 New York Ave NE, Washington, DC 20002. Any spraying operation would involve certified aerial applicators that meet the required district licensing standards. Certified personnel are required to inspect the aircraft and equipment prior to commencement of any spraying operation.

Radio communications would exist among the National Arboretum area observation/marketing personnel, the loading crew, and the spray aircraft. The spray helicopter pilot would be thoroughly familiar with the proposed treatment area including potential aerial hazards, areas having application difficulties, and sensitive areas to avoid, prior to the spray flight.

Gypsy moth control applications would be conducted only when atmospheric conditions meet those specified in Section 2.3.

Program personnel would evaluate proper insecticide deposition and efficacy using spray deposit dye cards. All treatment area boundaries will be identified using GPS. The arboretum will be closed during the treatment and signs will be posted informing visitors that areas of the arboretum have been sprayed.

5.7.2 Environmental Precautionary Measures

Spill containment and appropriate cleanup materials would be present at the pesticide storage site, during pesticide transport, and at the loading site, to prevent environmental contamination due to an accidental spill. Any rinse material used to clean spray equipment would be handled as hazardous material.

5.7.3 Human Health Precautionary Measures

The proposed spray will be conducted when the arboretum is closed to the public. All arboretum personnel will be notified in advance and will not be allowed in the spray areas.

The following precautions and requirements are taken from the Dimilin® label:

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION

Avoid contact with skin.

PERSONAL PROTECTIVE EQUIPMENT

Applicators and Other Handlers Must Wear: A long-sleeved shirt and long pants; shoes plus socks. Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is extremely toxic to crab, shrimp and other aquatic invertebrates. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark, except under the forest canopy when aerially applied to control forest pests. Drift or runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwaters.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

STORAGE - Store in a dry location.

PESTICIDE DISPOSAL - Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL - Triple rinse or equivalent. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

Operational exposure to the insecticide would, by far, have the highest potential degree of human exposure during this project. Stringent pesticide mixing and loading precautions and label directions would be followed to minimize human exposure to pesticides at the storage facility, during pesticide transport, and at the aircraft loading site. All employees handling pesticides would have received hazard communication training and would have available to them labels and MSDS's for the pesticides used.

Pesticide would be transported from the storage site to the aircraft loading site in vehicles that are equipped with spill containment and cleanup materials and with a separate cab and cargo section. The local hazardous material (HAZMAT) response teams would be contacted prior to and during the operation for HAZMAT contingency planning.

At the loading site, all valves, hoses, connections, pumps, and barrels would be inspected and maintained to prevent spillage and human exposure. Personnel certified in aerial application of pesticides would be present and supervise the mixing and loading of pesticide materials.

SECTION 6 - IRRETRIEVABLE AND IRREVERSIBLE COMMITMENT OF RESOURCES

No irreversible or irretrievable impacts are anticipated for natural resources or the environment. The commitment of labor, vehicle fuel, pesticides, aircraft fuel, aircraft maintenance, aircraft operations, and media notification, are all irreversible and irretrievable mission-oriented resources.

SECTION 7 - CONCLUSION

Following review of this site-specific environmental analysis which, in turn, was based upon the best currently available information, we have determined that implementing alternative 2 of this EA in the manner described would not cause significant environmental impacts or adverse effects.

SECTION 8 - PUBLIC PARTICIPATION

8.1 PUBLIC INVOLVEMENT

The draft EA outlining the proposed aerial application of pesticide for gypsy moth control at the National Arboretum will be announced in local print media and on the USNA web site, and sent to the following agency: Government of the District of Columbia, Department of the Environment. Comments will be addressed and if appropriate, a FONSI will be generated.

Publications at the National Arboretum will be used to notify area residents of the FONSI. Organizations in the proposed treatment area will be notified 7-10 days before the anticipated treatment date(s). The notifications will briefly describe the problem and the proposed action, present the components of the FONSI, mention that this was based upon an EA which was prepared for the proposed action, and cite a point of contact for any questions, concerns, or suggestions. The environmental document package, which includes a map of the treatment areas, will be available for inspection at the Visitor Information Desk at the U.S. National Arboretum.

8.2 PUBLIC NOTIFICATION

Notification of the aerial treatment to persons residing in the vicinity of the spray area will be executed by U.S. National Arboretum. This shall provide for notification of the general public through public media at least 24 hours prior to the aerial application date. Arboretum employees will be notified of the proposed application date through weekly email communications.

Information shared on aerial spray operations, will include:

1. Planned primary and alternate treatment dates and time of spraying (contingent upon weather conditions).
2. Area to be treated and why.
3. Information on the nature of the insecticide relative to warm-blooded animals, plants, and painted finishes at the dosages used.
4. Information on the aircraft flying at low altitudes.
5. Information on additional precautionary measures that can be taken to minimize pesticide exposure to humans (e.g., stay indoors during spraying, plan to be out of the treatment area, wash garden crops prior to eating) and effects on property (e.g., wash vehicles after spraying).

SECTION 9 - LIST OF AGENCIES AND PERSONNEL CONSULTED

1. USDA Forest Service, Rodney Whiteman, Forester
2. USDA Forest Service, Brad Onken, Forest Entomologist
3. USDA Forest Service, Amy Onken, Forest Entomologist
4. District Department of the Environment, Baldwin Williams, Env. Control Specialist
5. District Department of the Environment, Mary Pfaffko, Biologist

SECTION 10 - LIST OF PREPARERS

This document was prepared by:

Christopher Carley, IPM Specialist, U.S. National Arboretum

James Nelson, Forester, USDA Forest Service

Rodney L. Whiteman, Forester, USDA Forest Service

Lt Col Donald Teig, Entomologist, 757 AS/DOS

Anne Kaval, 316 CES/CEVP

Patricia Gray, 316 CES/CEVP

SECTION 11 - LIST OF REFERENCES

11.1 PERTINENT REGULATIONS AND LAWS

Clean Water Act, (33 USC s 1251 *et. seq.*).

Clean Air Act, as amended, (42 USC S 7401 *et. seq.*).

Endangered Species Act of 1973, as amended (16 USC S 1531 *et seq.*).

National Environmental Policy Act of 1969, as amended (42 USC S 4321 *et seq.*).

Title 40, CFR, 1991 rev., Part 1500-1508, Council on Environmental Quality.

Public Law 92-516, the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) of 1947, as amended.

11.2 LITERATURE CITED

Aker, Scott, 1998. USNA Pesticide Policy Manual

Miller, J.C. 1990. Field assessment of the effects of a microbial pest control agent on non-target Lepidoptera. *American Entomologist* 36:2, 135-139.

Sample, B.E., Butler, L., Zivkovich, C., Whitmore, R.C., and Reardon, R.C. 1996. Effects of *Bacillus thuringiensis* Berliner var. *Kurstaki* and defoliation by gypsy moth [*Lymantria dispar* (L.) (Lepidoptera: lymnatriidae)] on native arthropods in West Virginia. *The Canadian Entomologist* 128:573-592.

Whiteman, Rodney L., Biological Evaluation Of Gypsy Moth At USDA National Arboretum, 2007

SECTION 12 - ACRONYMS AND ABBREVIATIONS

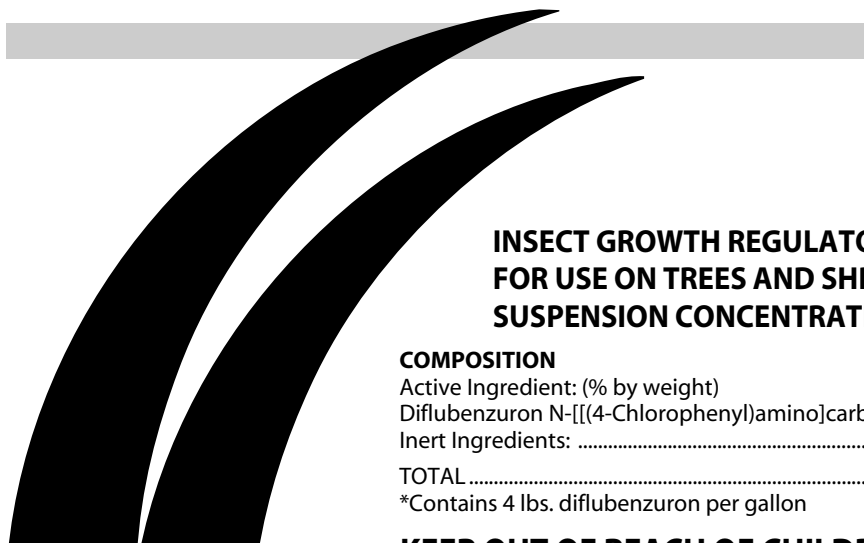
| | |
|---------------|---|
| APHIS | Animal Plant Health Inspection Service |
| AWS | Air Weather Service |
| <i>B.t.k.</i> | <i>Bacillus thuringiensis</i> variety <i>kurstaki</i> |
| CFR | Code of Federal Regulations |
| CY | calendar year |
| dBA | decibel A-weighted |
| DFB | diflubenzuron |
| EA | Environmental Assessment |
| EPA | Environmental Protection Agency |
| F | Fahrenheit |
| FONSI | Finding of No Significant Impact |
| FS | Forest Service |
| HAZMAT | Hazardous Material |
| IAW | in accordance with |
| ICUZ | Installation Compatible Use Zone |
| IPM | Integrated Pest Management |
| MD | Maryland |
| MSDS | Material Safety Data Sheet |
| mph | Miles Per Hour |
| NEPA | National Environmental Policy Act |
| PAO | Public Affairs Office |
| <i>spp.</i> | species |
| ULV | Ultra Low Volume |
| US | United States |
| USDA | United States Department of Agriculture |
| USEPA | United State Environmental Protection Agency |

RESTRICTED USE PESTICIDE

Due to toxicity to aquatic invertebrate animals.

For retail sale to and use only by Certified Applicators, or persons under their direct supervision, and only for those uses covered by the Certified applicator's certification.

Dimilin[®] 4L



Net contents:
2.5 gallons

INSECT GROWTH REGULATOR FOR USE ON TREES AND SHRUBS SUSPENSION CONCENTRATE

COMPOSITION

Active Ingredient: (% by weight)

Diflubenzuron N-[[[4-Chlorophenyl]amino]carbonyl]-2,6-difluorobenzamide* 40.4%

Inert Ingredients: 59.6%

TOTAL 100.0%

*Contains 4 lbs. diflubenzuron per gallon

KEEP OUT OF REACH OF CHILDREN CAUTION

FIRST AID

IF ON SKIN OR CLOTHING

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15 to 20 minutes.
- Call a poison control center or doctor for treatment advice.

IF INHALED

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible.
- Call a poison control center or doctor for further treatment advice.

EMERGENCY ASSISTANCE: Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

EMERGENCY PHONE

203-723-3670

SAFETY DATA AND INFORMATION

866-430-2775

TRANSPORTATION EMERGENCY (CHEMTREC)

800-424-9300

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS AND DOMESTIC ANIMALS CAUTION

Harmful if absorbed through skin or inhaled. Avoid contact with eyes, skin or clothing. Avoid breathing spray mist.

PERSONAL PROTECTIVE EQUIPMENT

Applicators and Other Handlers Must Wear: Long-sleeved shirt and long pants; shoes plus socks; chemical-resistant gloves, (such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, PVC or viton) when mixing and loading and **also using handheld equipment.**

USER SAFETY REQUIREMENTS

Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.



Chemtura Corporation
199 Benson Road
Middlebury, CT 06749

EPA REG. NO. 400-474

EPA EST. NO.

019/010408

www.chemtura.com

ENGINEERING CONTROLS

When handlers use closed systems (including water soluble bags), enclosed cabs or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR 170.240(d)(4-6), the handler PPE requirements may be reduced or modified as specified in the WPS.

USER SAFETY RECOMMENDATIONS

Users should **wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.**

Users should remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Users should remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to aquatic invertebrates. For terrestrial uses, do not apply directly to water or to areas where surface water is present or to intertidal areas below the mean high water mark. Drift or runoff from treated areas may be hazardous to aquatic invertebrate organisms in neighboring areas. Do not contaminate water when disposing of equipment washwaters.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application except as provided in the Quarantine Programs section of this label.

For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- coveralls
- chemical-resistant gloves made of any waterproof material.
- shoes plus socks.

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Do not enter or allow others to enter the treated area until sprays have dried.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

STORAGE: Store in a dry location.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL: Triple rinse or equivalent. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

GENERAL INSTRUCTIONS AND INFORMATION

Do not apply this product through any type of irrigation system.

SPRAY DRIFT LABELING

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator is responsible for considering all these factors when making decisions. The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

1. The distance of the outer most nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.

Where states have more stringent regulations, they should be observed.

The applicator should be familiar with and take into account the information covered in the [Aerial Drift Reduction Advisory Information](#).

Information on Droplet Size

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions).

Controlling Droplet Size

Volume - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.

- **Pressure** - Do not exceed the nozzle manufacture's recommended pressures. For many nozzle types lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.

- Number of nozzles - Use the minimum number of nozzles that provide uniform coverage.
- Nozzle Orientation - Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from the horizontal will reduce droplet size and increase drift potential.
- Nozzle Type - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length

For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height

Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment

When applications are made with a cross-wind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for the displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.)

Wind

Drift potential is lowest between wind speed of 2-10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. NOTE: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect drift.

Temperature and Humidity

When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are hot and dry.

Temperature Inversions

Applications should not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upwards and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas

The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g. when wind is blowing away from the sensitive areas).

GENERAL INFORMATION

DIMILIN 4L is an insect growth regulator which is effective on a wide variety of insect pests, predominately from the families Lepidoptera and Diptera. Because of its mode of action, which results in a disruption of the normal molting process of the insect larvae, the action of DIMILIN is slow and several days may elapse before the full effect is seen. Because of its specificity, DIMILIN does not affect bees or other beneficial insects when applied at labeled rates and is therefore an excellent product for use in IPM programs.

Mixing Instructions: Fill the spray tank with half the required amount of water. Begin agitation and add the required amount of DIMILIN 4L. Continue agitation while adding the remainder of the water. Agitation during application is recommended to maintain a uniform distribution of DIMILIN 4L in the water. Do not use equipment without adequate agitation.

GENERAL PRECAUTIONS AND RESTRICTIONS

Do not use in potable water or water used for swimming

Do not apply within 25 feet by ground or 150 feet by air of bodies of water such as lakes, reservoirs, rivers, permanent streams, natural ponds, marshes or estuaries.

DIRECTIONS FOR APPLICATION TREES AND SHRUBS

DIMILIN 4L is effective in controlling a variety of insect pests found on trees and shrubs in areas such as:

- Public and private forests
- Forest plantings and forest nurseries
- Christmas tree and conifer nurseries
- Residential and municipal shade tree areas and landscape plantings
- Recreational areas such as campgrounds, golf courses, parks, parkways*
- Shelterbelts
- Rights of way and other easements

*In campground or other recreational areas applications should be made during periods of minimal use. Notify persons using recreational facilities or living in the area to be sprayed before application of this or any other pesticide.

NOT FOR USE IN GREENHOUSES, SHADEHOUSES, OR INTERIORSCAPES.

Application Notes: Determining the correct volume of water to apply is highly dependent on the tree height, canopy size and application type.

For ground applications, use an adequate amount of water to obtain thorough coverage to the foliage without excessive runoff. As a general guideline, use the recommended per acre dosage of DIMILIN 4L in the following amounts of water.

| | |
|--------------------------------|----------------------------|
| High volume hydraulic sprayer | 100 - 400 gallons per acre |
| Mist blower, air blast sprayer | 5 - 30 gallons per acre |

For aerial applications, spray volumes of 1/2 to 5 gallons per acre are recommended.

Uniform coverage of the foliage is essential for optimum performance. The higher water volumes are recommended when application conditions are less than ideal, for very large or dense tree stands, for high population pressures or when insects have reached older instar stages.

Use Rates and Recommendations: The following table provides use rates and recommendations for optimum performance of DIMILIN 4L. In most cases, applications should be made when insect larvae are in the early instar stages. Applications made to late instar larvae may result in reduced foliage protection and the higher rates should be used.

| INSECT PEST | RATE FL. OZS. / ACRE | MAX. / YEAR FL. OZS. / ACRE | APPLICATION TIMING / NOTES |
|---|---------------------------------|--|--|
| Armyworms | 2 - 4 | 4 | Early instar |
| Bagworms | 1 - 2 | 2 | Early instars in mid to late June |
| Browntail Moth | 1 - 2 | 2 | When overwintering 2nd instars become active in late April / early May. |
| Budworms | 2 - 4 | 4 | 4th instar |
| Cankerworms | 2 - 4 | 4 | Early instars |
| Gypsy Moths | 0.5 - 2 | 2 | Early instar and prior to full leaf expansion (5 - 20%) |
| Hemlock Looper | 2 - 4 | 4 | Early instars |
| Leafminers (Lepidopterous) | - | 8 | Apply at a rate of 4 - 8 fl. ozs. in 100 gallons of water when oviposition begins on new growth flushes. |
| Oakworms | 2 - 4 | 4 | Early instars in August |
| Pandora Moth | 2 - 4 | 4 | After egg hatch in the fall or to early instars in the spring. |
| Pine Shoot Moth | 2 - 4 | 4 | Early instars |
| Pine Tip Moths | 1 - 2 | 2 | Early second generation instars or when 75% of first generation pupal cases are empty. Peak emergence can be determined by twig sampling, pheromone traps, degree days, etc. |
| Sawflies | 2 - 4 | 4 | Early instars |
| Spanworms | 2 - 4 | 4 | Early instars |
| Tent Caterpillars | 1 - 4 | 4 | Early instar and prior to full leaf expansion. |
| Tussock Moths | 2 - 4 | 4 | Early instars |
| Webworms | 1 - 2 | 2 | Early instars |
| Weevils (Diaprepes spp.) | - | 8 | Apply at a rate of 4 - 8 fl. ozs. in 100 gallons of water when adult weevils are present and/or to newly expanded growth. Will not control adult weevils but will reduce reproductive potential of adult weevils, resulting in decreased egg hatch. |
| Weevils (Terminal) of pine and spruce (Pissodes spp.) | 2 - 4 | 4 | Treat adults in early spring after snow melt and prior to egg deposition. Aerial applications not recommended. Thoroughly wet the leader and upper whorls of branches. Add an emulsifiable paraffinic crop oil at the rate of 1 to 2 gallons per acre. |
| Zimmerman Moth | 2 - 4 | 4 | Early instars in late summer prior to construction of hibernaculum. |

QUARANTINE PROGRAMS (Gypsy Moth)

For use in Quarantine programs conducted by State cooperators as well as USDA personnel of both Plant Protection and Quarantine, APHIS and the U.S. Forest Service.

For use in eradication of isolated infestations make two applications of 1 fluid ounce of DIMILIN 4L per acre 7-14 days apart.

For use in quarantine programs involving the movement of nursery stock from infested to non-infested areas, make two applications of 1 to 2 ounces of DIMILIN 4L per acre 7 - 14 days apart on nursery stock.

Notify persons living in the area to be sprayed before application of this or any other pesticide.

IMPORTANT NOTICE—Seller warrants that this product conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with the directions and instructions specified on the label under normal conditions of use, but neither this warranty nor any other warranty of merchantability or fitness for a particular purpose, express or implied, extends to the use of this product, contrary to label instructions, or under abnormal conditions, or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use.

® DIMILIN is a Registered Trademark of Chemtura Corporation

© Copyright 2007, Chemtura Corporation

DRAFT - FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT FOR AERIAL APPLICATION OF PESTICIDE FOR GYPSY MOTH CONTROL AT THE U. S. NATIONAL ARBORETUM, DC

INTRODUCTION

This Environmental Assessment (EA) addresses the aerial control of gypsy moths at the U. S. National Arboretum, Washington, DC. The EA is prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended, and in accordance with: Title 40, Code of Federal Regulations (CFR), Part 1500-1508, Council on Environmental Quality; all applicable policies and procedures of the U.S. Department of Agriculture and Agricultural Research Service and the USNA Pesticide Policy Manual.

Gypsy moth defoliation of hardwood trees, including many oak species, was observed during an aerial survey in June 2007 by US Forest Service Forester Rodney Whiteman. In addition, an egg mass survey conducted in October 2007, indicated that a very high population of gypsy moth can be expected this spring 2008. Repeated defoliation of those trees damaged in 2007 and new defoliation of drought-stressed trees, with a predicted rate of up to 84 percent defoliation, could lead to the mortality of numerous trees in the areas of risk. Mr. Whiteman recommended an aerial application of Dimilin® to prevent defoliation and possible tree mortality.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of and the need for action is to minimize the defoliation and mortality of native hardwood trees, as well as dozens of other genera of trees contained within the affected area by quickly and comprehensively reducing the gypsy moth population during the larval stage before much damage can occur. This Action will maintain healthy trees in woodland areas of the arboretum, preserve the environmental and aesthetic values of these trees, and avoid the significant cost of removing dead trees and replacing them.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Alternative 1 – No Action.

Under this scenario, no action to control gypsy moths would take place, other than measures presently used by the National Arboretum. Gypsy moth population levels would only be influenced by natural forces. Defoliation rates are predicted to be as high as 84%. This could lead to tree mortality and habitat loss.

Alternative 2: Proposed Action—Dimilin®

One aerial application of diflubenzuron (DFB or Dimilin®) at the rate of 1.0 oz formulated material in a total mix of 1 gallon per acre. This compound is widely used to control gypsy moths but can adversely affect populations of other non-targeted caterpillars and aquatic invertebrates. A helicopter would apply the insecticide when the eggs have hatched and the larvae have begun feeding, when leaf development is at least 30%, when the weather conditions are within the parameters specified in Section 2.3 of the EA. The actual time of application

would take about one hour. A single application of diflubenzuron is likely to provide both better foliage protection and greater gypsy moth population reduction than either Btk or Gypchek.

Alternative 3: *Bacillus thuringiensis kurstaki* (Btk)

Two applications of *Bacillus thuringiensis kurstaki* (*Btk*), which is a biological insecticide. *Btk* is a bacterium that acts specifically against lepidopterous larvae as a stomach poison and therefore must be ingested and is applied at a rate of 0.5 -1 gallon per acre. This compound is widely used to control gypsy moths but can adversely affect populations of other non-targeted caterpillars.

Alternative 4: Gypchek

Two aerial applications of the microbial insecticide, Gypchek, at the rate of 2 x 1011 OBs in a total mix of 1 gallon per acre, applied 3-5 days apart. This compound is not as effective in reducing gypsy moths and can also affect non-target caterpillars.

SUMMARY OF ANTICIPATED ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE PROPOSED ACTION

Resources addressed in this EA include noise, land use, air quality, safety, geological resources, water resources, biological resources, cultural resources, socioeconomics and environmental justice, hazardous materials and waste management, and infrastructure. Based upon currently available information, the proposed use of Dimilin® should not significantly impact wildlife and non-target organisms due to this material's target specificity, mode of action, low persistence, rapid biodegradability, and limited use. Every effort would be made during the course of this project to conduct a safe and effective program.

PUBLIC REVIEW AND INTERAGENCY AND INTERGOVERNMENTAL COORDINATION PLANNING

The public and Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) review of the Draft EA was conducted from 23 March to 30 April 2008. Copies of these documents were available for review at the Visitors Desk at the U.S. National Arboretum, 3501 New York AV NE, Washington, DC 20002 . The Arboretum point of contact for this project was Mr. Christopher Carley, USNA, 3501 New York AV, NE Washington, DC 20002

FINDING OF NO SIGNIFICANT IMPACT

I conclude that the environmental effects of the proposed aerial control of gypsy moths at the U.S. National Arboretum are not significant, that preparation of an Environmental Impact Statement unnecessary, and that a FONSI is appropriate. The preparation of the EA is in accordance with NEPA, council on Environmental Quality regulations, and code 32 Code of federal Regulations Part 989, as amended and is herein incorporated by reference.

—

Thomas Elias, Director, U.S. National Arboretum

Date