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Marketing and Regulatory Programs

Animal and Plant Health Inspection Service

Asian Longhorned Beetle Cooperative Eradication Program in Worcester and Middlesex Counties, Massachusetts

Environmental Assessment
September 2008

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Agency Contact:
Julie Twardowski, Coordinator
National Asian Longhorned Beetle Program
USDA, APHIS, PPQ
ALB Eradication Program
4700 River Road, Unit 137
Riverdale, MD 20737

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I. Introduction

Asian longhorned beetle (*Anoplophora glabripennis*) (ALB) is a foreign wood-boring beetle that threatens a wide variety of hardwood trees in North America. The native range of ALB includes China and Korea. ALB is believed to have been introduced into the United States from wood pallets and other wood packing material accompanying cargo shipments from Asia.

ALB was first discovered in August 1996 in the Greenpoint neighborhood of Brooklyn, New York. Within weeks, another infestation was found on Long Island in Amityville, New York, after officials learned that infested wood had been moved from Greenpoint to Amityville.

In July 1998, due to the U.S. Department of Agriculture's (USDA) national ALB pest alert campaign, a separate infestation was discovered in the Ravenswood area of Chicago. This discovery prompted APHIS to amend its existing quarantine of wood movement in infested areas and place additional restrictions on importing solid wood packing material into the United States from China and Hong Kong.

In October 2002, ALB was discovered in Jersey City, New Jersey, and in August 2004, ALB was discovered in the Borough of Carteret, the Avenel section of Woodbridge Township, and in the nearby cities of Rahway and Linden, New Jersey. It was subsequently found in 2007 in Richmond County, New York (Staten Island), across the Arthur Kill River from the New Jersey infestation sites.

In August 2008, ALB was discovered in Worcester County, Massachusetts. This infestation appears to be 8 to 10 years old. The infested area is currently being delimited to determine the extent of the infestation. Although no ALB have been discovered in Middlesex County, it is being included in this document because of its proximity to the find in Worcester and in case infestations of ALB are eventually found there.

A. Biology

ALB is classified in the wood-boring beetle family Cerambycidae. Adults are 1 to 1½ inches in length with long antennae and are shiny black with small white markings on the body and antennae. After mating, adult females chew depressions into the bark of various hardwood tree species in which they lay (oviposit) their eggs. There are 11 known genera of host trees: *Acer* (maple and box elder), *Aesculus*

(horsechestnut), *Salix* (willow), *Ulmus* (elm), *Betula* (birch), *Albizia* (mimosa), *Celtis* (hackberry), *Fraxinus* (ash), *Plantanus* (sycamore and London planetree), *Sorbus* (mountain ash), and *Populus* (poplar).

Once the eggs hatch, small white larvae bore into the tree, feeding on the vascular layer beneath. The larvae continue to feed deeper into the tree's heartwood forming tunnels, or galleries, in the trunk and branches. This damage cuts off nutrient flow and weakens the integrity of the tree which will eventually kill it if the infestation is severe enough. Sawdust debris, or frass, is commonly found on the base of afflicted trees as well. Infested trees are also prone to secondary attack by other diseases and insects.

Over the course of a year, a larva will mature and then pupate. From the pupa an adult beetle emerges, chewing its way out of the tree, forming characteristic round holes approximately three-eights of an inch in diameter. The emergence of beetles typically takes place from June through October with adults then flying in search of mates and new egg-laying sites to complete their life cycle.

B. Purpose and Need

USDA's Animal and Plant Health Inspection Service (APHIS) is proposing an eradication and quarantine program for ALB in Worcester and Middlesex Counties in Massachusetts. This action is necessary to eradicate ALB from Massachusetts, as well as prevent the spread of ALB to other States.

APHIS has the responsibility for taking actions to exclude, eradicate, and/or control plant pests under the Plant Protection Act (7 United States Code (U.S.C.) 7701 et seq.). It is important that APHIS take steps necessary to implement a quarantine and eradicate ALB from Massachusetts to prevent damage to hardwood trees in North America. The program utilizes removal of host trees, insecticide injections into trees or soil, and herbicides.

This environmental assessment (EA) has been prepared consistent with the National Environmental Policy Act of 1969 (NEPA) and APHIS' NEPA implementing procedures (7 Code of Federal Regulations (CFR) part 372) for the purpose of evaluating how the proposed action, if implemented, may affect the quality of the human environment.

APHIS has prepared four other EAs that are relevant to this current EA: Asian Longhorned Beetle Control Program (December 1996), Asian Longhorned Beetle Program (February 2000), Asian

Longhorned Beetle Cooperative Eradication Program, Hudson County, New Jersey (March 2003), and Asian Longhorned Beetle Cooperative Eradication Program in the New York Metropolitan Area (May 2007).

II. Alternatives

This EA analyzes the potential environmental consequences associated with the proposed action to eradicate ALB from Worcester County and Middlesex County, Massachusetts, should ALB be found there. Two alternatives are being considered: (1) no action by APHIS to treat new infestations of ALB, and (2) the preferred alternative to eradicate ALB from Worcester County and from Middlesex County should ALB be found there. Eradication efforts include removal of infested trees and ALB host trees followed by chipping or burning, chemical injections into the soil or trunk of host trees outside the cutting zone, and use of an herbicide on cut trees to prevent regrowth.

A. No Action

Under the no action alternative, APHIS would continue to implement the quarantine restrictions in the area as defined in the quarantine order for Worcester County, Massachusetts. No eradication efforts would be undertaken by APHIS. Some control measures could be taken by other Federal or non-Federal entities; however, these measures would not be controlled nor funded by APHIS.

B. Preferred Alternative

The ALB eradication program (preferred alternative) is a cooperative effort among APHIS, the U.S. Forest Service (USFS), State cooperators, impacted municipalities, and local residents. The Massachusetts cooperators include the Department of Conservation and Recreation, the Department of Agricultural Resources, and the City of Worcester. APHIS and the cooperators share responsibility for survey; regulatory; tree removal, destruction, and restoration; and public outreach. APHIS has the lead responsibility in the areas of survey, chemical control, environmental monitoring, data management, public outreach, and technology enhancement. USFS helps communities recover from tree loss with reforestation efforts, works with APHIS on technology enhancement issues and public outreach, and helps APHIS detect infestations.

Under the preferred alternative, APHIS and its cooperators would implement an eradication program to rid ALB from any sites where it may be found in Worcester and Middlesex Counties, Massachusetts. The eradication program will consist of maintaining the current ALB

quarantine and adding new areas to the quarantine area if additional ALB-infested areas are discovered, selective tree removal of infested trees and ALB-host trees followed by chipping or burning, soil or trunk injections with imidacloprid, and the use of the herbicide triclopyr (Garlon®) on stumps of cut infested trees to eliminate regrowth.

The current quarantine restricts the movement of firewood, green lumber, and other living, dead, cut, or fallen material including nursery stock, logs, stumps, roots, and branches from potential host trees. These articles may not move outside the quarantine zone unless each article is issued a certificate by an APHIS or State cooperating inspector.

Surveys are made of all host trees within a designated area surrounding an infested tree to ensure that they are not infested with ALB. The surveyors look for signs of infestation, such as round ALB exit holes and heavy sap flow from damaged sites on the trees. ALB inspectors utilize many methods and resources to conduct tree surveys. Inspectors conduct visual surveys from the ground using binoculars to look for signs of infestation. Aerial tree inspections are performed by trained professionals using bucket trucks to peer into trees from above. Tree climbers also survey trees to search for signs of an infestation. Many interest groups and organizations voluntarily assist inspectors by searching trees from the ground.

The eradication treatment program will consist of establishing a quarantine zone, cutting infested trees, removing selected host trees within a ½-mile radius from the ALB find, removing stumps or treating stumps of ALB-infested trees with herbicide to stop resprouting, and treating potential host trees with imidacloprid trunk and/or soil injections within ½ mile of an ALB find. For control purposes, hosts include *Acer spp., Aesculus spp., Albizia julibrissan, Betula spp., Celtis spp., Fraxinus spp., Platanus spp., Populus spp., Salix spp., Sorbus spp.,* and *Ulmus spp.*

All host trees that are removed from within the regulated area must be chipped inside the quarantine zone to a size less than 1 inch in at least two dimensions. Chips of this size are no longer subject to Federal or State regulations and may be disposed of in any way. Host material that is not chipped may be moved to an approved burning site. It is recommended that the roots of infested host trees be removed to a minimum of 9 inches below ground level using a stump grinder. Any aboveground roots of a diameter ½-inch or more should also be removed. Because of limitations in moving equipment into certain areas, the program may apply a cut stump herbicide treatment instead

of using a stump grinder. For this, the herbicide Garlon® 3A (triclopyr) is applied after the ALB-infested tree has been cut down. Program personnel will spray or paint the root collar area, sides of the stump, and the outer portion of the cut surface including the cambium until thoroughly wet, but not to runoff. A handheld wand sprayer or brush is used to apply the herbicide to the stump to prevent it from resprouting and becoming reinfested with ALB. Stump grinding or application of Garlon® 3A will *only* be conducted on trees that are infested with ALB.

Imidacloprid trunk and/or soil injections will be made for host trees found within ½ mile of an ALB find. Imidacloprid treatments are typically made in early spring in order to allow the insecticide to be distributed throughout the tree and, therefore, be most effective during the active ALB larval and emergence period. Chemical treatments of imidacloprid are made through direct injection either into the tree trunk or into the soil immediately surrounding the tree. The rate of imidacloprid depends on the application method, as well as diameter at breast height (dbh) of the host tree.

For soil injection, imidacloprid is injected at a minimum of 4 injection sites placed evenly around the base of the tree. It is applied using 1.42 grams (g) of imidacloprid diluted in ½ cup of water for each inch of dbh. The insecticide is applied under the soil around the base of the tree, normally no more than 12 inches from the base. No material may puddle or run off-site. Soil injection treatments can take up to 3 months before sufficient quantities of imidacloprid are observed in target plant tissues.

For trunk injections, holes are drilled around the trunk, 2 to 6 inches above the soil-wood line. For Mauget (non-pressurized) injection capsules, the capsules are seated in each hole in the tree at a rate of one capsule per 2 inches dbh for host trees measuring between 2 and 24 inches dbh. Host trees measuring more than 24 inches dbh are treated with 2 capsules per every 2 inches of dbh. The injection capsules are removed from the tree after 4 hours to ensure that the imidacloprid has emptied out of the unit and into the tree. During the 4-hour injection period, project personnel safeguard each tree to ensure capsules are not disturbed or removed during application. Safeguarding ensures treatment efficiency and safety from exposure to people and animals.

For pressurized injection, a tree can be treated in 5 minutes because there is no need to wait for passive uptake of the insecticide into the tree. Trunk injections are applied at a rate of 0.22 g of imidacloprid for each inch of dbh for host trees measuring 24 inches or less dbh,

and 0.44 g of imidacloprid for each inch of dbh for host trees over 24 inches dbh. For both trunk injection methods, the insecticide is distributed throughout the tree in 1 to 3 weeks.

The ALB eradication program proposed for use is an adaptive management program that is based upon the recently revised new pest response guidelines for Asian longhorned beetle (USDA, APHIS, 2008). As experience dictates the need for minor changes in the program, the changes will be incorporated to maximize the effectiveness of the eradication efforts without completing additional environmental documentation. If, however, the changes are not minor, such as a change in chemicals or use of a different technology, additional environmental documentation will be required.

III. Affected Environment

The potential treatment area contains ALB host trees within Worcester and Middlesex Counties in Massachusetts. Worcester County is located in the middle of Massachusetts separating western Massachusetts on one side from eastern Massachusetts and the Greater Boston area on the other side. The county had a population of 750,963 people during the 2000 U.S. census with a population density of 496 people per square mile.

Middlesex County is located to the east of Worcester County. As of the 2000 U.S. census, the population was 1,465,396 people with a population density of 700 people per square mile.

This potential treatment area is within the New England and Eastern New York Upland major land resource area (USDA, NRCS, 2006). The majority of the land in this area (about 50 percent) consists of private hardwood and pine forested areas (USDA, NRCS, 2006). These forested areas are mainly used for wood production and/or hunting (USDA, NRCS, 2006).

In Massachusetts, there are 214 maple sugaring farms in 9 counties (MDAR, 2008). There are 21 maple sugaring farms in Worcester and 5 in Middlesex Counties (MDAR, 2008). Maple production season usually starts in mid- to late February in the eastern part of the State and may not start until the first week of March for the western parts of the State. Most producers are finished boiling by mid-April.

There are many beekeepers in both Worcester and Middlesex Counties of Massachusetts. Beekeepers will bring their hives to agricultural fields to help pollinate various crops such as apples, pears, blueberries, cranberries, and pumpkins. In addition, beekeepers harvest honey,

beeswax, and other hive products. Massachusetts ranks second in New England for honey production.

IV. Environmental Impacts

A. No Action

Environmental impacts from the no action alternative are related to the damage caused by the establishment and spread of ALB. The potential establishment would cause damage to and loss of valuable ornamental and commercial trees, as well as naturalized and forested areas. If ALB were allowed to spread to other parts of the country, it could result in damage to commercial trees, as well as products such as maple syrup and hardwood lumber.

The wide distribution of host plants suggests the danger that ALB could spread across much of the country with increases in damage and losses commensurate with the spread. The damage and losses could result in reduction of private property value. There would be changes in composition and age structure of forests which could have long-term effects on the ecological relationships in the naturalized and forested areas.

As ALB continues to spread, other Federal agencies or non-Federal entities may try to control or eradicate ALB through the use of chemical treatments. There are elevated environmental risks from the uncoordinated application of pesticides to limit the damage from ALB.

B. Preferred Alternative

Under the preferred alternative, areas found to have ALB will be quarantined and treated using cutting and chemical treatments. The quarantine itself will have no environmental effects, although it can limit industry that relies on transporting host trees and their products outside the quarantine zone. However, this limit does not outweigh the risks to industry if ALB is allowed to establish and spread into new areas.

The cutting (removal) of susceptible host trees within a defined radius of an ALB find may have adverse effects on local wildlife that depend on vegetation for food, cover, and related needs. This is particularly true for some invertebrates and other animals that have a limited foraging range. The primary issue to humans from loss of trees is aesthetic. The impacts on environmental quality from the removal of host trees are expected to be negligible. Only trees that are known to

be hosts for ALB will be tagged for cutting and chipping or burning. This will limit the environmental effects in the cutting area.

1. Triclopyr

Triclopyr, which is marketed as Garlon®, is commonly used for control of woody and broadleaf plants under a variety of use patterns ranging from poison ivy control by homeowners to maintenance of rights-of-way. It is a widely used and commonly available product for both consumers and commercial herbicide applicators for the purposes described above and, therefore, it is difficult for APHIS to estimate the the quantity of triclopyr applied in Worcester and Middlesex counties, Massachusetts. For this program, it will be applied only to the trunks of infested trees in specific areas, thus limiting exposure of humans and other plant and animal wildlife to Garlon®. Toxicity is considered low with the exception of terrestrial plants. Drift and runoff will be limited because of the application method (direct hand application to infested trees). The method of application and adherence to label requirements will minimize the exposure and risk to human health, as well as aquatic and terrestrial nontarget organisms (see appendix A). Cumulative effects from the use of triclopyr are not expected due to the reasons stated above (site-specific application, lack of drift and runoff potential, and low toxicity to organisms other than terrestrial plants).

2. Imidacloprid

Imidacloprid is used in a wide variety of sites to control many pests including certain beetles, leafhoppers, and white flies. It is a commonly available product for both consumers and commercial pesticide applicators for the purposes described below and, therefore, it is difficult for APHIS to estimate the quantity of imidacloprid applied in Worcester and Middlesex Counties, Massachusetts. The use of imidacloprid to treat host trees within a defined radius outside the cutting and chipping or burning area from an ALB find is discussed in detail in appendix B. Imidacloprid will be applied according to label directions by injection into soil at a rate of 1.42 g of active ingredient, diluted in ½ cup of water per inch of tree dbh, or directly into susceptible trees as either a 5 or 10 percent solution.

The use of imidacloprid in maple syrup production areas would preclude the organic certification of that area for a period of 3 years. In order to be certified as organic, no synthetic fertilizers, herbicides, or pesticides can be used within 3 years of the application for certification. The proposed eradication program in Worcester and Middlesex Counties is not expected to affect any organic certified maple syrup production areas. However, if ALB were to spread beyond these two counties, particularly into western Massachusetts, loss of organic certification could occur, depending upon where treatments would be needed.

Based on the proposed method of application and available effects data, exposure and risk to terrestrial vertebrates is expected to be minimal. Imidacloprid exposure to terrestrial invertebrates, particularly honey bees, is expected to be minimal based on expected residues from the proposed method of application, the presence of other nontreated flowering plants, and the available acute and chronic honey bee toxicity data for imidacloprid (see appendix B).

The method of application eliminates the potential for drift and, in the case of tree injections, eliminates the probability of off-site transport via runoff that may affect aquatic species. There is a potential for subsurface transport of imidacloprid to aquatic habitats for applications made directly into soil; however, this type of exposure will be minimized by only making applications where the ground water table is not in proximity to the zone of injection, and in soil types that would minimize the probability of pesticide transport. Any residues that could reach aquatic environments would be below effect levels for aquatic biota and not pose a significant risk.

Potential exposure to humans will be primarily for applicators and workers. Human health effects associated with the administration of imidacloprid will be mitigated through adherence to pesticide label requirements and standard operating procedures. The required protective gear and safety precautions will minimize exposure and risk.

There is a potential for dietary exposure to humans through the consumption of products from maple trees that may be treated. Chemical injections of imidacloprid are anticipated in early spring prior to the emergence of ALB. Maple sugaring is usually started in February to March and ends by the middle of April. APHIS will work cooperatively with growers to insure applications result in negligible residues, if any, and are well below the levels that have been determined during the registration process of imidacloprid to protect all segments of the population.

Cumulative effects from the use of imidacloprid, under the preferred alternative, are not anticipated. The effects from the quarantine, cutting, and chemical treatments are short-lived (USDA, APHIS, 2003). Imidacloprid is commonly used on turf (including golf course and lawns) and ornamentals for insect control. In the ALB program, it is applied to potential host trees that are in proximity to ALB-infested trees as either a soil or trunk injection. There is little opportunity for off-site movement because it is injected directly into the potential host tree or into soil at the base of the tree where it is quickly absorbed through the roots. Because there is little or no environmental

exposure, other than inside the targeted tree, little to no environmental loading or cumulative impact is anticipated from the use of imidacloprid in the proposed ALB program.

C. Threatened and Endangered Species

Section 7 of the Endangered Species Act (ESA) and its implementing regulations require Federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat. There is only one federally listed species within the two counties, a threatened plant, the small whorled pogonia (*Isotria medeoloides*). As a protection measure for the small whorled pogonia, if treatments are planned within the towns where the small whorled pogonia occurs, APHIS will coordinate further with U.S. Fish and Wildlife Services (FWS). APHIS determined that with the implementation of this protection measure, the ALB program may affect, but is not likely to adversely affect, the small whorled pogonia. APHIS has prepared a biological assessment and received concurrence from FWS on its determination.

D. Other Considerations

Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations," focuses Federal attention on the environmental and human health conditions of minority and low-income communities, and promotes community access to public information and public participation in matters relating to human health and the environment. This EO requires Federal agencies to conduct their programs, policies, and activities that substantially affect human health or the environment in a manner so as not to exclude persons and populations from participation in or benefiting from such programs. It also enforces existing statutes to prevent minority and low-income communities from being subjected to disproportionately high or adverse human health or environmental effects. The human health and environmental effects from the proposed applications are expected to be minimal and are not expected to have disproportionate adverse effects to any minority or low-income family.

EO 13045, "Protection of Children from Environmental Health Risks and Safety Risks," acknowledges that children, as compared to adults, may suffer disproportionately from environmental health and safety risks because of developmental stage, greater metabolic activity levels, and behavior patterns. This EO (to the extent permitted by law and consistent with the agency's mission) requires each Federal agency to

identify, assess, and address environmental health risks and safety risks that may disproportionately affect children. The program applications are made directly to trees which may occur in parks and residential areas where children would be expected to play and climb trees; however, the program applicators ensure that the general public is not in or around areas being treated, minimizing exposure from trunk or soil injection applications. Based on the lack of significant exposure, no disproportionate risks to children are anticipated as a consequence of implementing the preferred alternative.

The need for a U.S. Army Corps of Engineers (USACE) section 404 permit for conducting the proposed eradication program in wetland areas was considered. After discussions with the Regulatory Division of USACE in Concord, Massachusetts, it was determined that the proposed actions did not require such a permit.

IV. Listing of Agencies and Persons Consulted

Massachusetts Department of Agricultural Resources
Crop Inspectional Services and Pest Management
251 Causeway Street
Boston, MA 02114–2151

Massachusetts Department of Conservation and Recreation
251 Causeway Street
Boston, MA 02114–2119

U.S. Army Corps of Engineers
Regulatory Division
696 Virginia Road
Concord, MA 01742

U.S. Department of Agriculture
Animal Plant Health Inspection Service
PPQ–Emergency and Domestic Programs
4700 River Road, Unit 137
Riverdale, MD 20737

U.S. Department of Agriculture
Animal Plant Health Inspection Service
PPQ–Environmental Compliance
4700 River Road, Unit 150
Riverdale, MD 20737

U.S. Department of Agriculture
Animal Plant Health Inspection Service
PPD–Environmental Services
4700 River Road, Unit 149
Riverdale, MD 20737

U.S. Department of Agriculture
Animal Plant Health Inspection Service
PPQ–ALB Eradication Program
920 Main Campus Drive, Suite 200
Raleigh, NC 27606

U.S. Fish and Wildlife Services
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301

V. References

IDA—See Illinois Department of Agriculture

Illinois Department of Agriculture, 2006. Gov. Blagojevich Proclaims July 12 Asian Longhorned Beetle Deregulation Day. July 2006. Springfield, IL.

MDAR—See Massachusetts Department of Agricultural Resources

Massachusetts Department of Agricultural Resources, 2008. Maple sugaring commodity fact sheets. [Online]. Available: http://www.mass.gov/agr/facts/maple.htm. [September 8, 2008].

USDA, APHIS—See U.S. Department of Agriculture, Animal and Plant Health Inspection Program

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2008. New pest response guidelines: Asian longhorned beetle (*Anoplophora glabripennis)*. Revised August 2008. Riverdale, MD

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2003. Asian Longhorned Beetle Cooperative Eradication Program Hudson County, New Jersey. March 2003. Riverdale, MD

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2000. Asian Longhorned Beetle Program. February 2000. Riverdale, MD

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 1996. Asian Longhorned Beetle Control Program. December 1996. Riverdale, MD

U.S. Department of Agriculture, Natural Resource Conservation Service, 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Appendix A. Garlon® 3A

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) proposes the use of Garlon® 3A in the treatment of stumps from infested trees that have been removed to eradicate the Asian longhorned beetle (ALB). Stumps will be treated with Garlon® 3A in cases where physical removal is not possible. All applications will be made in accordance with the label recommendations by making paint or spray applications of undiluted product to freshly cut stumps. The use of this product will insure that ALB cannot infest recently cut stumps.

Effects

Garlon® 3A contains the active ingredient, triclopyr triethylamine salt (TEA), which is a pyridine systemic herbicide commonly used for control of woody and broadleaf plants. The product causes significant eye irritation but has low acute inhalation and dermal toxicity. Acute oral median lethal concentrations range from approximately 600 to 1,000 milligram/kilogram (mg/kg) suggesting low to moderate toxicity (USFS, 2003). Long-term toxicity studies have shown that triclopyr TEA is not a carcinogen or mutagen, and that toxicity in developmental and reproductive studies primarily occurs at high doses and at levels that are also maternally toxic (EPA, 1998). The primary degradation product of triclopyr TEA, triclopyr acid, has also been evaluated and found to have a similar mammalian toxicity profile.

Triclopyr TEA toxicity to terrestrial nontarget organisms is considered low with the exception of terrestrial plants. Toxicity to avian species is low for triclopyr TEA with oral and dietary median lethal toxicity values greater than 2,000 mg/kg and 10,000 parts per million (ppm), respectively (USFS, 2003; EPA, 2008). Chronic toxicity to birds is also expected to be low with reproductive toxicity no observable effect levels (NOEL) of 100 and 500 ppm for the mallard and bobwhite quail respectively, when exposed to triclopyr acid (EPA, 1998). Triclopyr TEA is considered practically nontoxic to honey bees based on acute contact studies (EPA, 1998). Triclopyr TEA does exhibit toxicity to terrestrial plants, as expected, based on results from seedling emergence, germination, and vegetative vigor studies. The primary degradation product of triclopyr TEA, triclopyr acid, is similar in toxicity to terrestrial nontarget organisms based on the available toxicity data.

Toxicity to aquatic organisms is low for fish and aquatic invertebrates. Available acute fish toxicity data demonstrates median lethal concentrations greater than 100 milligram/Liter (mg/L) for formulated and technical triclopyr TEA. Triclopyr TEA is considered practically nontoxic to aquatic invertebrates in freshwater and marine environments with toxicity values exceeding 300 mg/L. Chronic toxicity to fish and aquatic invertebrates is also low with chronic toxicity no observable effect concentrations (NOEC) ranging from approximately 80 mg/L to greater than 100 mg/L, depending on the test organism and endpoint. Triclopyr acid is considered practically nontoxic to aquatic organisms based on available toxicity data.

Exposure and Risk

Exposure to humans and the environment is expected to be minimal based on the environmental fate and use pattern proposed in this program. Triclopyr TEA is considered mobile based on the available information regarding soil adsorption but breaks down in soil (~12 days) and water (< 1 hr) to the acid, and to a lesser extent triethanolamine. Half-lives of the acid in water are short ranging from 0.5 to 2.5 days, while in soil half-lives range from 8 to 18 days (EPA, 1998). Triethanolamine also has a short half-life in the environment under most conditions with soil and water half-lives ranging from 5.6 to 13.7 days in soil, and 14 to 18 days in water under aerobic conditions (EPA, 1998). The acid can break down to 3,5,6-trichloro-2-pyridinol (TCP) in soil and water, and available toxicity data suggests TCP is more toxic to aquatic nontarget organisms than either triclopyr TEA or the acid. Triethanolamine is less toxic than the parent or acid to aquatic organisms based on limited toxicity data. Volatilization is not expected to be a significant exposure pathway due to the low vapor pressure that has been measured for triclopyr TEA, and the associated acid.

Significant risk from Garlon® 3A applications to human health is not expected based on the available use pattern and mammalian toxicity data. Exposure will be limited primarily to applicators because treatments are made directly to stumps. Adherence to required personal protective equipment and other label directions will minimize exposure and risk to workers, as well as the environment. Exposure to terrestrial and aquatic nontarget organisms is also expected to be minimal. Significant drift or runoff is not expected because applications are not broadcast-applied but are made using either a backpack sprayer to deliver a coarse droplet size on the outside cambium area of recently cut stumps, or by painting the material on individual stumps. The low probability of off-site transport of triclopyr TEA, and its associated by-products, results in exposure levels that demonstrate minimal risk to aquatic and terrestrial nontarget organisms.

References

EPA—See U.S. Environmental Protection Agency

U.S. Department of Agriculture, Forest Service, 2003. Triclopyr: revised human health and ecological risk assessments. Final report. SERA TR 02043013003b. 264 pp.

U.S. Environmental Protection Agency, 2008. EFED pesticide ecotoxicity database. [Online]. Available: http://www.ipmcenters.org/pesticides.cfm. [Sept. 17, 2008].

U.S. Environmental Protection Agency, 1998. Reregistration eligibility decision (RED): triclopyr. EPA 78–R–98–011. 269 pp.

USFS—See U.S. Department of Agriculture, Forest Service

Appendix B. Imidacloprid

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) is proposing the use of imidacloprid, that is available in various formulations, as a means to control Asian longhorned beetle (ALB) in susceptible tree species. The product will be applied according to label requirements by injection into soil at a rate of 1.42 g active ingredient diluted in ½ cup of water per inch of tree diameter, or directly into susceptible trees as either a 5 or 10 percent solution. Imidacloprid is a systemic insecticide in the neonicotinoid insecticide class which is used on a variety of crops to control a large number of pests including certain beetles, leafhoppers, and white flies.

I. Effects

A. Human Health

Technical and formulated imidacloprid has low to moderate acute oral mammalian toxicity with median toxicity values ranging from 400 to greater than 2,000 mg/kg. The technical material, as well as several formulations, are considered practically nontoxic from dermal or inhalation exposure (USFS, 2005; USDA, APHIS, 2002a). Acute lethal median toxicity values are typically greater than 2,000 mg/kg and 2.5 mg/L for dermal and inhalation exposures, respectively. Available data for imidacloprid and associated metabolites suggest a lack of mutagenic, carcinogenic, or genotoxic effects at relevant doses. Developmental, immune, and endocrine related effects have been observed in some mammal studies. In all cases, the noted effects were observed at doses above maternal effects, in the case of developmental studies, and at concentrations and durations not expected in the ALB eradication program (USFS, 2005).

B. Terrestrial Nontarget Organisms

Imidacloprid has low to moderate acute toxicity to wild mammals based on the available toxicity data. Imidacloprid is considered toxic to birds with acute oral median toxicity values ranging from 25 to 283 mg/kg (USDA, APHIS, 2002a; EPA, 2008; USFS, 2005). Reproduction studies using the mallard and bobwhite quail have shown no effect concentrations of approximately 125 ppm for both species.

Technical and formulated imidacloprid is considered acutely toxic to honey bees and other related bee species by oral and contact exposure. Median lethal toxicity values range from 3.7 to 230 nanograms (ng)/bee (Schmuck et al., 2001; Tasei, 2002; USFS, 2005; EPA, 2008). Acute sublethal effects in laboratory studies have shown that the no observable effect concentrations (NOEC) may be less than 1 ng/bee (USFS, 2005). Imidacloprid metabolite toxicity to honey bees is variable with some of the metabolites having equal toxicity to imidacloprid while other metabolites are considered practically nontoxic (USFS, 2005). Due to concerns regarding the potential sublethal impact of imidacloprid to honey bees, several studies have been conducted to determine potential effects in laboratory and field situations. Studies to assess the effects of imidacloprid on homing behavior, colony development, foraging activity, reproduction, wax/comb production, colony health, as well as other endpoints, revealed that there was a lack of

effects, or effects were observed at test concentrations not expected to occur under realistic exposure scenarios (Tasei et al., 2000; Tasei et al. 2001; Tasei, 2002; Bortolloti et al., 2003; Maus et al., 2003; Morandin and Winston, 2003; Stadler et al., 2003; Schmuck, 2004).

C. Aquatic Nontarget Organisms

Imidacloprid has low toxicity to aquatic organisms including fish, amphibians, and some aquatic invertebrates. Acute toxicity to fish and amphibians is low with acute median lethal concentrations typically exceeding 100 mg/L (EPA, 2008; USFS, 2005). Chronic toxicity to fish is in the low parts per million range depending on the test species and endpoint. Aquatic invertebrates are more sensitive to imidacloprid when compared to fish with acute median toxicity values in the low part per billion range to greater than 100 mg/L depending on the test species (USDA, APHIS, 2002a; EPA, 2008; USFS, 2005).

II. Exposure and Risk

Imidacloprid is soluble in water and is considered to have moderate mobility based on soil adsorption characteristics for several soil types. Based on field dissipation studies, the foliar half-life is less than 10 days while the persistence in soil can range from 27 to 229 days, (CA DPR, 2006; USFS, 2005). In water, imidacloprid is stable to hydrolysis at all relevant pH values but breaks down rapidly in the presence of light with aqueous photolysis half-life values typically less than 2 hours. The low volatility and proposed method of application in this program minimizes the potential for exposure to imidacloprid by air.

A. Human Health Exposure and Risk

Based on the expected use pattern for both types of imidacloprid applications, potential exposure will be primarily for applicators and workers. Exposure to applicators will be reduced by following label directions, including recommendations for personal protective equipment, resulting in minimal risk to applicators.

There is the potential for dietary exposure to the public in cases where maple trees that may be treated are used in the production of maple syrup, or if residues leach into groundwater supplies that are used as a drinking water source. In regard to treatment of maple trees, USDA, APHIS will work cooperatively with growers to insure applications result in negligible residues, if any, and are well below levels that have been determined during the registration process of imidacloprid to protect all segments of the population. Exposure to groundwater is expected to be minimal, based on the proposed method of application and monitoring data that has been collected in association with ALB eradication efforts in other States. Groundwater sampling between 2003 and 2006 in Suffolk County, New York, demonstrated that approximately half of the samples had no detectable levels of imidacloprid and, of those where detections occurred, the average concentration was 3.2 ppb which is below levels of concern for human health. Samples with detectable levels of imidacloprid do not suggest a contribution from the ALB eradication program because other uses of imidacloprid occurred in these areas, and there did not appear to be a significant correlation between ALB related treatment activities and increased residues.

B. Terrestrial Nontarget Organisms

Exposure and risk to terrestrial vertebrates is expected to be minimal, based on the proposed method of application and available effects data. Exposure from drift is not expected, nor is any significant runoff, based on the use pattern for imidacloprid in the ALB eradication program. There is the possibility of some imidacloprid exposure to mammals and birds that may feed on insects or vegetation from treated trees; however, under worst-case-exposure scenarios, the risk is considered minimal.

Imidacloprid exposure to terrestrial invertebrates, especially honey bees, is also not expected to result in significant risk to pollinators. Pollinator exposure to imidacloprid will be minimized by the fact that only treated trees and their associated flowers and pollen could have residues while other flowering plants in the area of treatment will not contain residues. The potential level of imidacloprid in pollen from trees that have been treated for ALB is unknown however, is expected to be low, based on the available data for other plants. Previous studies have shown that imidacloprid levels in pollen and flowers are low compared to other parts of the plant. Schmuck et al. (2004) found that levels of imidacloprid and associated metabolites were below the level of detection (0.001 mg/kg) in sunflowers. Laurent and Rathahao (2005) found average imidacloprid residues from sunflower pollen of 13 micrograms (µg)/kg, while Bonmatin et al. (2005) found average imidacloprid levels of 6.6 and 2.1 µg/kg in flowers and pollen from treated maize seed. These reported sunflower and corn pollen residues are within the range of values from other studies and are similar to imidacloprid residue levels found in the nectar and pollen for rape (Maus et al., 2003). Chauzat et al. (2006) found that approximately 50 percent of the pollen samples collected from pollen traps in apiaries contained measurable levels of imidacloprid with an average concentration of 1.2 µg/kg. As part of the environmental monitoring program, USDA, APHIS analyzed for imidacloprid residues in flowers collected from imidacloprid-treated willow, horse chestnut, and maple trees from New York during and after ALB eradication efforts (USDA, APHIS, 2002b; USDA, APHIS, 2003). With the exception of one maple flower sample (0.13 mg/kg), all residues were below the level of quantification or detection (level of detection = 0.03 mg/kg) over a 2-year sampling period. Residues in flowers were lower than in twig and leaf residues which is similar to observations in other plant species, such as corn and sunflowers. The risk to honey bees and other pollinators is expected to be minimal, based on expected residues from the proposed method of application and the presence of other nontreated flowering plants, both of which minimize exposure, and the available acute and chronic honey bee toxicity data for imidacloprid.

Exposure of imidacloprid to soil invertebrates, in cases of soil injection, is possible. However, the impacts would be localized to the areas of treated soil and would be transient, based on available data (USFS, 2005). In cases where imidacloprid is tree-injected, the exposure and risk to soil-dwelling terrestrial invertebrates would be minimized.

C. Aquatic Nontarget Organisms

Imidacloprid exposure in aquatic environments is also expected to be minimal and not pose a significant risk to aquatic biota. The method of application eliminates the potential for drift, and in the case of tree injections eliminates the probability of off-site transport via runoff. There is a

potential for subsurface transport of imidacloprid to aquatic habitats for applications made directly into soil. This type of exposure will be minimized by only making applications where the ground water table is not in proximity to the zone of injection and avoiding soils that have a high leaching potential. Any aquatic residues that could occur would be below effect levels for aquatic biota due to the low probability of off-site transport and environmental fate for imidacloprid.

Summary

The use of imidacloprid in the ALB program does not pose significant risk to human health and the environment based on the available effects and environmental fate information. Adherence to the label and the proposed use pattern for select trees in this program reduces exposure and risk to applicators, the public, and terrestrial and aquatic nontarget organisms.

References

Bonmatin, J.M., Marchand, P.A., Charvet, R., Moineau, I., Bengsch, E.R., and Colin, M.E., 2005. Quantification of imidacloprid uptake in maize crops. J. Agric. Food Chem. 53:5336–5341.

CA DPR—See California Department of Regulation

California Department of Pesticide Regulation, 2006. Environmental fate of imidacloprid. Environmental Monitoring: Department of Pesticide Regulation. 16 pp.

Chauzat, M.P., Faucon, J.P., Martel, A.C., Lachaize, J., Cougoule, N., and Aubert, M., 2006. A survey of pesticide residues in pollen loads collected by honey bees in France. J. Econ. Entomol. 99(2):253–262.

EPA—See U.S. Environmental Protection Agency.

Gels, J.A., Held, D.W., and Potter, D.A., 2002. Hazards of insecticides to the bumble bees, *Bombus impatiens* (Hymenoptera: Apidae) foraging on flowering white clover in turf. J. Econ. Entomol. 95(4):722–728.

Laurent, F.M., and Rathahao, E., 2005. Distribution of [^{14}C] imidacloprid in sunflowers (*Helianthus annuus* L.) following seed treatment. J. Agric. Food Chem. 51:8005–8010.

Maus, C., Cure, G., and Schmuck, R., 2003. Safety of imidacloprid seed dressings to honey bees: a comprehensive overview and compilation of the current state of knowledge. Bull. Insect. 56(1):51–57.

Morandin, L.A., and Winston, M.L., 2003. Effects of novel pesticides on bumble bee (Hymenoptera: Apidae) colony health and foraging ability. Environ. Entomol. 32(3):555–563.

Schmuck, R., 2004. Effects of a chronic dietary exposure of the honeybee, *Apis mellifera* (Hymenoptera: Apidae) to imidacloprid. Arch. Environ. Contam. Toxicol. 47:471–478.

Schmuck, R., Schoning, R., Stork, A., and Schramel, O., 2001. Risk posed to honeybees (Apis mellifera L, Hymenoptera) by an imidacloprid seed dressing of sunflowers. Pest Manag. Sci. 57:225–238.

Stadler, T., Gines, D.M., and Buteler, M. Long-term toxicity assessment of imidacloprid to evaluate side effects on honey bees exposed to treated sunflower in Argentina. Bull. Insect. 56(1):77–81.

Tasei, J.N., Lerin, J., and Ripault, G., 2000. Sublethal effects of imidacloprid on bumblebees, *Bombus terrestris* (Hymenoptera: Apidae), during a laboratory feeding test. Pest Manag. Sci. 56:784–788.

Tasei, J.N., Ripault, G., and Rivault, E., 2001. Hazards of imidacloprid seed coating to Bombus terrestris (Hymenoptera: Apidae) when applied to sunflower. J. Econ. Entomol. 94(3):623–627.

Tasei, J.N., 2002. Impact of agrochemicals on non-*Apis* bees. *In*: Honey bees: estimating the environmental impacts of chemicals. Ed. J. Devillers and M.H. Pham-Delegue. Taylor and Francis Publishing. pp. 101–131.

USDA, APHIS—See U.S. Department of Agriculture, Animal and Plant Health Inspection Service

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2007. Environmental monitoring report: 2006 Asian Longhorned Beetle Cooperative Eradication Program for the active eradication region in Suffolk County, New York. 36 pp.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2003. Environmental monitoring report: Asian Longhorned Beetle Cooperative Eradication Program in New York and Illinois. 51 pp.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2002a. Use of imidacloprid formulations for the control and eradication of wood boring pests: assessment of the potential for human health and environmental impacts. 68 pp.

U.S. Department of Agriculture, Animal and Plant Health Inspection Service, 2002b. Environmental monitoring report: 2000–2001 Asian Longhorned Beetle Cooperative Eradication Program. 87 pp.

U.S. Department of Agriculture, Forest Service, 2005. Imidacloprid: Human health and ecological risk assessment (Final Report). SERA TR 05-43-24-03a. 28 pp.

U.S. Environmental Protection Agency, 2008. EFED Pesticide Ecotoxicity Database. [Online]. Available: http://www.ipmcenters.org/pesticides.cfm. [Sept. 17, 2008].

USFS—See U.S. Department of Agriculture, Forest Service

Finding of No Significant Impact
Asian Longhorned Beetle Cooperative Eradication Program
in
Worcester and Middlesex Counties, Massachusetts
Environmental Assessment
September 2008

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), has prepared an environmental assessment (EA) for eradication of Asian longhorned beetle (ALB) from a recently discovered infested site in Worcester, Massachusetts, and any additional future finds in Worcester and Middlesex Counties, Massachusetts. The EA is incorporated into this Finding of No Significant Impact (FONSI) by reference. It is available online at http://www.aphis.usda.gov/plant_health/ea and from:

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Emergency and Domestic Programs
Planning and Coordination
4700 River Road, Unit 137
Riverdale, MD 20737–1229

The EA analyzed two alternatives: (1) no action by APHIS to treat new infestations of ALB and, (2) the preferred alternative, to eradicate ALB from Worcester County and Middlesex County should ALB be confirmed there. The eradication program includes the removal of infested trees and ALB host trees, followed by chipping or burning, chemical injections into the soil or trunk of host trees, and use of an herbicide on cut trees to prevent regrowth. The eradication program also includes maintaining the current ALB quarantine and adding new areas to the quarantine area if additional ALB-infested areas are discovered.

The preferred alternative consists of a cooperative effort among APHIS, the U.S. Forest Service (USFS), State cooperators, impacted municipalities, and local residents. The Massachusetts cooperators include the Department of Conservation and Recreation, the Department of Agricultural Resources, and the cities of Worcester, Holden, Boylston, West Boylston, and Shrewsbury. If ALB is found in other municipalities in Worcester or Middlesex Counties, those municipalities will also be invited to become cooperators. APHIS and its cooperators share responsibility for survey, regulatory action, tree removal and destruction, chemical applications, restoration, and public outreach. APHIS has the lead responsibility in the areas of survey, chemical control, environmental monitoring, data management, public outreach, and technology enhancement. USFS helps communities recover from tree loss with reforestation efforts, works with APHIS on technology enhancement issues and public outreach, and helps APHIS detect infestations.

APHIS considered the potential environmental consequences of each alternative in the EA. The no action alternative could result in the spread of ALB throughout the area and across the country, thereby causing considerable damage to host plants and associated habitats and

industries, particularly the hardwood lumber and maple industries, which are in close proximity to the Worcester infestation. Successful implementation of the preferred alternative would result in negligible local impacts to wildlife habitat and an aesthetic impact to humans because of the cutting of host trees. The cutting is restricted to relatively small areas and only host trees, not all trees, are affected. Further, any impacts will be mitigated to the extent that FS and the other cooperators replant trees. Impacts from the use of triclopyr or imidacloprid will be negligible. Imidacloprid will be either directly injected into host trees, thus effectively eliminating environmental exposure, or injected into the soil at the base of the tree where it will rapidly be taken into the tree and unavailable to nontarget organisms. These methods of application eliminate the potential for drift and, in the case of tree injections, eliminates the probability of off-site transport via runoff. There is a potential for subsurface transport of imidacloprid to aquatic habitats for applications made directly into soil. This type of exposure will be minimized by only making applications where the ground water table is not in proximity to the zone of injection and avoiding soils that have a high leaching potential. Any aquatic residues that could occur would be below effect levels for aquatic biota due to the low probability of off-site transport and environmental fate for imidacloprid. Impacts from triclopyr are also expected to be negligible. The potential for off-site movement via drift or runoff is very small since it would only be applied by hand sprayer or painted directly on the stumps of cut host material.

Cumulative effects based on the preferred alternative are not anticipated. The effects from the quarantine, cutting, and chemical treatments are short-lived. Both triclopyr and imidacloprid are commonly used pesticides. The use of triclopyr in the proposed ALB program will result in site-specific application, lack of drift and runoff potential, and low toxicity to organisms other than terrestrial plants. The proposed use of imidacloprid will result in little opportunity for off-site movement because it is injected directly into the potential host tree or into soil at the base of the tree where it is quickly absorbed through the roots. Because there is little or no environmental exposure other than inside the targeted tree little to no environmental loading or cumulative impact is anticipated from the use of imidacloprid in the proposed ALB program.

There is a potential that removal of infested trees could occur within designated wetlands. If this is the case, work in those areas is anticipated to take place during the winter when the ground is frozen, thus minimizing impacts to wetlands. APHIS and its cooperators will work with the U.S. Army Corps of Engineers and State and local authorities to insure compliance with wetland protection laws and regulations.

In informal consultation, APHIS and the U.S. Fish and Wildlife Service (FWS) have determined that only one federally listed species is present in the two counties—the small whorled pogonia. If treatments are planned in areas where this plant occurs, APHIS will coordinate further with FWS to insure compliance with the Endangered Species Act.

Prior to the release of the EA for public comment, a public meeting was held to discuss the ALB infestation in Worcester. The meeting was generally supportive of eradicating ALB from the area, although two environmental issues were raised by concerned citizens—one was the wetland issue that has been discussed above, and the other was a concern by bee keepers for the potential impacts to honey bees from the use of imidacloprid in the eradication program. Based on these

concerns, APHIS specifically analyzed the potential for risk to honey bees in the EA and concluded that the "risk to honey bees and other pollinators is expected to be minimal, based on …minimize[d] exposure, and the available acute and chronic honey bee toxicity data for imidacloprid."

On October 3, 2008, APHIS released the EA for public comment. The comment period expired on November 2; no comments were received. In addition, another public meeting was held in Worcester on October 29 and, again, there were no comments to the EA.

I have determined that there would be no significant impact on the quality of the human environment from the implementation of the preferred alternative. APHIS' finding of no significant impact from the preferred alternative is based on past experience with ALB eradication efforts in Chicago and the New York metropolitan area, the application of standard operating procedures for the applications, and the expected environmental consequences, as analyzed in the EA.

Further, I find the preferred alternative of expanding the quarantine area, removal and chipping or burning of host trees, and chemically treating host trees with either a soil application or trunk injection to be consistent with the principles of environmental justice as expressed in Executive Order 12898. Implementation of the preferred alternative will not result in any disproportionately high adverse human health or environmental effects on any minority populations or low-income populations. In addition, the preferred alternative is consistent with Executive Order 13045 "Protection of Children from Environmental Health Risks and Safety Risks." There will be no disproportionate effects to the environmental health and safety of children with the implementation of this program. Lastly, because I have not found evidence of significant environmental impacts associated with the proposed program, I further find that an environmental impact statement does not need to be prepared and that the program may proceed.

Christine MarkJham

Christine Markham
National Asian Longhorned Beetle Program Director
Plant Protection and Quarantine
Animal and Plant Health Inspection Service

11/21/2008

Date