ENVIRONMENTAL MONITORING PLAN

for imidacloprid

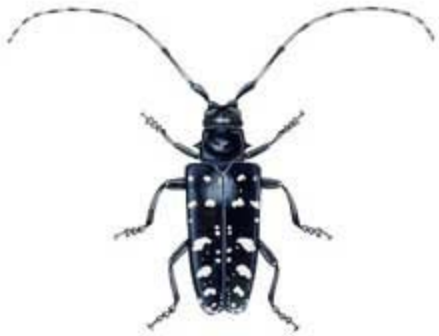
ASIAN LONGHORNED BEETLE COOPERATIVE ERADICATION PROGRAM
Boston & Worcester, Massachusetts
2011

United States Department of Agriculture

Animal and Plant Health Inspection Service

Plant Protection and Quarantine

Prepared by the Environmental Compliance Team



March 2011 version

General

The United States Department of Agriculture (USDA) - Animal and Plant Health Inspection Service (APHIS) Directive 5640.1 (4/19/02) commits the Agency to a policy of fulfilling the mandates of the National Environmental Policy Act; the Endangered Species Act; the Federal Insecticide, Fungicide, and Rodenticide Act; and other statutes that require monitoring the potential effects of Federal programs on the environment. The monitoring described in this Environmental Monitoring Plan (EMP) supports these commitments for the Massachusetts Asian Longhorned Beetle (ALB) Cooperative Eradication Program.

Environmental sampling for residues of imidacloprid is proposed to validate the assumptions of the Environmental Assessments created for the program and to address specific concerns raised by the public. Imidacloprid is a systemic insecticide used as a treatment of ALB host trees at risk for infestation. ALB host trees may be treated via ground or trunk injection based on the size of the tree, local hydrology, and other factors. Targets identified for monitoring include groundwater, surface water, and non-target organisms. Monitoring will be conducted to determine if ALB Program systemic treatments of host trees result in the movement of imidacloprid beyond the immediate treatment area.

Samples collected as part of this plan will be reported to the ALB Program management in an annual report. If any residue samples seem unusually high, ALB Program management will be contacted immediately to determine what, if any, action may be needed to adjust Program operating procedures. This monitoring plan is a working document and will be updated as needed based on new information provided to the Environmental Compliance Team (ECT). It is designed to be a reference document for staff that will work with the Environmental Compliance Team to collect and document monitoring samples during the ALB eradication program. Training will be provided in early 2011 to field staff on implementing this monitoring plan. The monitoring described below is for 2011. The EMP will be updated annually.

Human and Environmental Health

Objectives

Monitoring for potential exposure is designed to:

1. demonstrate the effectiveness of ALB operational procedures in excluding or minimizing exposure of the public and the environment to Program-applied imidacloprid;
2. collect data which can be used to evaluate whether the assumptions used in the Environmental Assessments are valid estimates of potential exposure of the public and the environment to Program-applied imidacloprid; and
3. investigate any Program-related complaints or reports of adverse effects on public health, worker safety, environmental quality, or non-target species.

Methods

This document is a reference for ALB program staff and may not address issues that are brought to the attention of the program staff at upcoming public meetings and as the program progresses. If additional monitoring or new types of monitoring are necessary, please contact Bob Baca at

301-734-7592 or by email at robert.m.baca@aphis.usda.gov for guidance. APHIS environmental monitoring is flexible and easily altered, but discussions will be needed to determine the best course of action given the analytical tools available.

Sensitive Site Inventory

The ALB program will identify sensitive sites prior to the initiation of chemical treatments. Sensitive sites are areas where the public may be exposed directly to chemicals and areas where there are specific concerns about potential impacts due to program activities. The program will identify any ground or surface waters used as a source of drinking water in or adjacent to the proposed treatment area. Additional sensitive sites may include, but are not limited to, the location of apiaries, schools and playgrounds, and vernal pools.

Descriptions and locations of sensitive sites identified by the program will be provided to the ECT. It is preferred that these lists be submitted in an electronic form, but they may also be submitted as a printed hard copy. Note the name and location of the water, the type of water (ground, surface, lake, etc.), and the distance and direction from the nearest treatment area. Prior to the start of chemical treatments, provide the list of sensitive sites to the ECT at the following address:

Dr. Robert Baca, USDA-APHIS-PPQ, 4700 River Road, Unit 150, Room 5A-04b,
Riverdale, MD 20737 or via email to robert.m.baca@aphis.usda.gov

Minimum Required Sample Sizes

Samples collection procedures are described below, but for easy reference, the following table provides the minimum sample sizes required to analyze a single sample type for imidacloprid:

Sample Type	**Minimum Size**
Leaves, twigs, bark	50 grams
Soil, sediment	50 grams
Sap, honey	50 ml
Water	4800 ml
Bees	25 bees

It may be possible to analyze smaller samples, but at best they will be less precise. If the minimum sample size is not available, collect as much as possible from the sample location. The table above shows the types of samples that the lab can currently analyze. If other types of samples are collected, their analysis is not guaranteed and it could take several months for the lab to develop a satisfactory analytical method. We do not suggest taking samples beyond those in the table, though you may find it necessary in certain situations. Contact the ECT promptly for guidance on collection of such samples.

Surface Water samples

Surface water samples will be collected near the shore of ponds, lakes, or reservoirs, with priority given to any identified as a source of drinking water. Pre-treatment surface water samples should be collected approximately one week prior to the initiation of the spring 2011

programmatic chemical treatments . Additional samples should be collected at these stations approximately one week following treatments and then approximately one, three, and six months later. Care should be exercised to ensure the water samples are free of turbidity and sediment. 4.8 liters of water will be collected for analysis from each sample station. (For minimum sample sizes for all sample types, see the last page of this document.) Following collection, samples will be kept on ice, in the dark, and remain chilled until they can be frozen for shipment. For more detailed information on sampling procedures, refer to *SOP EM-03 Collection of Water Samples,* available at http://www.aphis.usda.gov/plant_health/plant_pest_info/emt/support_docs.shtml.

Groundwater samples

Groundwater monitoring wells, installed as part of third-party subsurface environmental investigations, have been identified in the City of Worcester, and the Towns of Holden, West Boylston, and Shrewsbury. However, no treatments are expected at this time at sites near groundwater wells, and no sampling of such wells is required. If such samples are found necessary, they will be collected from the unconfined aquifer (i.e. water table) at chosen sites prior to the initiation of the spring 2011 programmatic chemical treatments, approximately one week following treatments, one month following treatments, and at two-month intervals thereafter.

Each time groundwater samples are collected, the volume of water in each well will be determined. If possible three well volumes will be purged and the well will be allowed to recharge before collecting the sample for analysis. Samples will be obtained using well bailers, peristaltic pumps, or submersible pumps depending on the well location and depth to water. 4.8 liters of water will be collected for analysis from each well. Following collection, samples will be kept on ice, in the dark, and remain chilled until they can be frozen for shipment. For more detailed information on sampling procedures, refer to *SOP EM-14 Collection of Groundwater Samples*, available at http://www.aphis.usda.gov/plant_health/plant_pest_info/emt/support_docs.shtml.

Leaf Litter Samples

Whenever possible, leaf litter samples (not leaves from treated trees) will be collected each time ground- and surface water samples are collected. Leaf litter will be collected around treated trees (no conifer needles) near and up-gradient from the monitoring wells. If no leaf litter is available, please note that on the 2060 Environmental Monitoring Form for the groundwater sample. Do not collect leaves that are on trees if no leaf litter is available. For more detailed information on sampling procedures, refer to *SOP EM-07 Collection of Vegetation Samples,* available at http://www.aphis.usda.gov/plant_health/plant_pest_info/emt/support_docs.shtml.

Soil Samples

Whenever possible, soil samples will be collected each time ground- and surface water samples are collected. Soil from within about six inches from the surface will be collected around treated trees. For more detailed information on sampling procedures, refer to *SOP EM06 - Collection of Soil Samples,* available at http://www.aphis.usda.gov/plant_health/plant_pest_info/emt/support_docs.shtml.

Vernal Pool-Related Samples

Vernal pools represent potential new sample areas in 2011. If vernal pools are identified for environmental monitoring, the same sampling techniques above for water, soil, and leaf litter are appropriate. Water should be collected from the pool directly, and care should be taken to not stir up the sediment (sediment makes the chemical analysis more difficult). Soil samples should be taken from the dry pool area at those times of year when water is absent. If water is present, soil samples should be taken from the wet soil adjacent to the vernal pool, but no so close as to mix up the soil and pool water. Leaf litter samples should also be taken in close proximity to the vernal pool.

Bee-Related Samples

The Agricultural Research Service (ARS) of USDA is working cooperatively with APHIS to investigate the response of bee hives to imidacloprid treatments in the Worcester area. The ARS experiment is very thorough with very sensitive analytical capabilities. Any monitoring conducted as part of this plan will be used to supplement the samples collected by ARS, and will not seek to duplicate their work. Monitoring of bees and honey is not anticipated in the Boston area at this time, but could easily be incorporated into the monitoring scheme as needed.

If safe and practical, the Program should work with local beekeepers to collect bee and honey (from the hive) samples. As sampling through time is expected, it is optimal to work with beekeepers who will agree to multiple sampling events each year. Preference should be given to beekeepers with hives in proximity to treatments, but sampling is encouraged throughout the Worcester area.

Bee and honey samples should be collected from each hive. Samples should be collected prior to the start of spring treatments, approximately one week following treatments, one month following treatments, and at two-month intervals thereafter. A single sample of bees from a hive should comprise 25 or more bees. Healthy bees should be collected whenever practical, placed in a foil bag, and frozen prior to shipping (for details, see *SOP EM-08 Collection of Insect Samples*). A single honey sample from a hive should be 50 ml, and need only be kept dark prior to shipping. Freezing the honey may break the glass sample container.

Monitoring for Incidents or Complaints

Priority sampling will be conducted to investigate incidents of unknown origin involving non-target species or other unintended environmental or human health impacts possibly associated with Program-applied imidacloprid. Information about priority sampling can be found in *SOP EM-09, Priority (Emergency) Sampling*. Collect priority samples as soon as possible after the complaint, request, or problem is reported. Contact the ECT at (301) 734-7592 to collaborate on a sampling plan, sampling methods, and types of samples to collect in order to optimize the investigation. If the incident occurs on a weekend, commence the investigation and sampling without delay, and contact the ECT as soon as possible on Monday.

Proper documentation of the incident, investigation, and samples is <u>extremely</u> important. When responding to priority incidents, send to the ECT all GPS maps showing the site, location where samples were collected, the nearest treatment area, and treatment history. Be sure to completely fill out all information on the APHIS 2060 forms with each sample. Be sure to provide an

incident/complaint report to the ECT, along with any other information that you feel will be helpful in resolving the incident (i.e. photos, observations at the site, etc.).

Endangered and Threatened Species

There are no federally protected species in the eradication area at this time. Should the eradication area expand to areas where protected species become a concern, monitoring may be required and this monitoring plan will be updated accordingly.

Sample Processing

Documentation

Complete a separate APHIS 2060 form for each sample collected. (A blank copy is attached for reference. Please only use original 2060 forms supplied by the Gulfport Laboratory for documentation.) Instructions for completing the APHIS 2060 forms are on the back of each form. All appropriate sections of the form should be completed. Samples should be marked as "routine" unless they were collected for a complaint or incident investigation where they should be marked as "priority." For each sample, submit the ***blue*** copy of the APHIS 2060 form to the Center for Plant Health Science and Technology (CPHST) in Gulfport, Mississippi with the sample; the ***white*** copy of the form to CPHST in the sample shipping container but separate from the sample; and the ***yellow*** copy of the form (and any maps, photos, etc.) to the Environmental Compliance Team (ECT) in Riverdale, Maryland. The ***pink*** copy is retained by the sample collector.

Shipment of Samples

Ship all samples using some form of overnight delivery. See SOP EM-17, *Packaging and Shipping of Samples* for details. Do not ship samples using USPS Priority Mail or standard ground service with other carriers. Overnight delivery allows the sample to stay frozen. Shipping any other way will take no less than two to three days and can ruin the samples. Be sure that all samples are frozen (except for honey), shipped in a cooler box (not a regular cardboard box), and kept cold during shipment. To keep samples cold, ship samples on ice. *Do not use dry ice*, since it will cause the sample containers to crack or break. Either use "blue ice" containers (the reusable plastic containers with the blue liquid/gel inside) or contained regular ice (that is, seal the ice in zip-loc bags). Unsealed ice will melt and leak during shipment, causing unnecessary concern in transit or when received at the laboratory.

Supplies

Most supplies for monitoring are ordered through the CPHST Gulfport Laboratory, although certain supplies are obtained locally. A checklist for ordering supplies is located below. This checklist is used by all APHIS pest control programs, and several of the supplies listed do not pertain to the ALB Program. The Gulfport Laboratory prefers that supply orders be faxed to them using the numbers listed on the checklist rather than leaving a voice message for orders.

Responsibilities

***APHIS-PPQ Environmental Compliance staff in Riverdale, Maryland will*:**

1. Review and interpret field and pesticide residue data from the sample collectors and the laboratory. Contact the sample collector for clarification as soon as possible if any field data is incomplete or unclear. Notify the Program Director or Manager immediately if any residue data is unexpectedly high in value.
2. Provide training, clarification, and interpretation on how to implement the Environmental Monitoring Plan.
3. Submit a comprehensive interpretive report to the Program Director and the National Coordinator within 60 working days of receiving all of the Program's field data and sampling results.

APHIS-PPQ Center for Plant Health Science and Technology Laboratory staff in Gulfport, Mississippi will:

1. Prepare and ship supplies required for the collection, stabilization, and shipment of environmental monitoring samples.
2. Provide training on methods for collecting, handling, preserving, and shipping samples.
3. Respond to requests for additional information by field personnel when special sampling requirements occur.
4. Analyze monitoring samples according to standard operating procedures for imidacloprid.
5. Complete analyses and report results on the following schedule:
    a. Within 23 working days after receipt, complete analyses of all routine samples and send results to the ECT.
    b. Within 5 working days after receipt, complete analyses of all priority/emergency samples and send results to the ECT.
    c. Contact ECT if the projected completion schedules need to be extended due to sample load or laboratory instrument problems.
6. Forward copies of all environmental monitoring forms and any attached documentation to the ECT each week via overnight mail.

APHIS-PPQ Field Personnel or Cooperators, will:

1. Ensure that sufficient resources from the Program are allocated for completing the monitoring activities described in the Environmental Monitoring Plan (EMP).
2. Follow instructions in the EMP and referenced SOPs to develop a plan for sample collection and documentation, including:
    a. Collection of the type and number of samples recommended in the EMP.
    b. Completion of a separate APHIS 2060 form for each sample that is collected.
    c. Providing all the information necessary to document the samples. Send all supporting documentation, including a copy of the appropriate APHIS 2060 forms to the ECT. Send all samples and appropriate APHIS 2060 forms to the laboratory. Ship all samples and supporting documentation in accordance with protocols and procedures.
    d. Notification of the laboratory prior to shipping any priority, spill, or unusual (i.e. other than water, insect, or vegetation) samples.

Environmental Monitoring Supplies Checklist & Order Form

- use the blank areas to indicate the number of items to take to the field or how many of that item being ordered from the Gulfport Laboratory-

General Monitoring Supplies			
Monitoring plan/SOP's	Obtain from ECT	Ice chest and wet or blue ice	Obtain locally
Field log notebook		Thermometer	
Compass		Baby wipes	
Rain gauge		2060 monitoring forms	
Indelible marker		4" x 4" resealable plastic bags	
Packing/strapping tape		10" x 10" resealable plastic bags	
Styrofoam coolers/mailers		12" x 12" resealable plastic bags	

Soil Samples		Dye Cards	
Soil core sampler (used only for sampling at depth)		Oil-sensitive dye cards (50 per package)	
Hand trowel		Water-sensitive dye cards (one set of paired cards packaged)	
12 x 12 x ¼ inch mesh screen		5' bamboo poles/stakes	
10" x 14" foil envelopes		Paper/alligator clips	
Vegetation/Fish/Insect Samples		Tacks	
Pruning shears/scissors		Tweezers/forceps	
10" x 14" foil envelopes		Nitrile gloves (box of S,M,L,XL)	
Strapping tape		**Water Samples**	
Aquatic Sediment Samples		Hach dissolved oxygen kit (refills)	
Dredge tied to strong rope		collapsible cubitainer (gallon size)	
Hand trowel		collapsible cubitainer (liter size)	
3" mesh screen		Sodium sulfate (small vials)	
10x14" foil envelopes		pH paper (0-14 range)	
		Acid or base (squeeze bottle)	Obtain locally

A.R.S.E. (Run-off Sampling)		Wipe Samples (malathion only)	
Plexiglas cover		2” x 2” sterile cotton pads in a resealable plastic bag	
8"x 8" mesh screen		Metric ruler	
Tent pegs/nails		Pencil	
Funnels attached to caps		Disposable gloves (box)	
500 ml glass bottles		Isopropyl alcohol	Obtain locally
4" PVC pipe, 14" long		**Neat (Pure) Chemical Formulations**	
Post hole digger		Amber glass bottle (2 ounce size) (also used for honey samples)	
Pea gravel, rocks/bricks	Obtain locally	Parafilm	
Bamboo pole/flagging tape		Small mailing tubes	
collapsible cubitainer (gallon size)		Protective eyewear	
Sodium sulfate (small vials)		Disposable pipette	
pH paper (0-14 range)		Pipetting bulb	
Acid or base (squeeze bottle)	Obtain locally	Disposable gloves	

NOTE: This list above for each sample group is to remind you of important items for that sampling, but some items are useful for all sampling. For example, disposable gloves should be used for all sampling, but are especially critical for neat, dye card, and wipe samples.

Program: _____ **Requested by: _____**

Date: _____ **Phone: _____**

Address: _____

_____

_____

To order supplies, indicate the quantity of each items needed. Fax or mail a copy of this form to CPHST Gulfport Lab at 228-822-3137 or barbara.moffett@usda.gov. If fax machines are not working, leave a message with the CPHST Gulfport Lab supplies manager at 228-822-3106. Please realize that it may be difficult to completely fill order for large quantities of materials.

This is not an exhaustive supply list…items that are not listed here may be available through CPHST Gulfport Lab. Not all supplies listed above are required for all pest control programs.

OMB NO.: 0579-0117

PRESS HARD,
YOU ARE MAKING 4 COPIES
See Guidelines on back of this form.
Use a separate form for each sample collected.

Environmental Monitoring Form

41033H

1. Program	2. State	3. County	4. Site Identification	5. Date Collected MO-DA-YR	6. Time Collected

7. Sample Description	8. Location DISTANCE (Ft.)	DIRECTION	9. Pesticide	10. Formulation	11. Application Method	Rate	12. Sample Type
							☐ Priority ☐ Routine

13. Dates Treatment Applied

1 Month	1 Day	2 Month	2 Day	3 Month	3 Day	4 Month	4 Day	5 Month	5 Day	6 Month	6 Day	7 Month	7 Day	8 Month	8 Day

14. Total Trtmnts	15. Time of Last Treatment	16. Soil Type *(from county soil survey)*	17. Land Slope *(Degrees)*	18. Last Rainfall MONTH	DAY	AMT.	19. Wind SPEED	DIRECTION	20. Rel. Hum.

21. Water Body Type *(Pool, Pond, Reservoir, Well, Stream, etc.)*	Size *(Acres or Width)*	22. Water Depth *(Feet)*	Velocity *(Ft./Min.)*	Temp. *(°F)*	pH *(include decimal pt.)* Before	After	Dissolved Oxygen *(mg/L)*	23. Average Air Temp. *(°F)*

24. **Remarks** *(e.g. Sketch of site, unusual occurrences, additional information unique to sample, etc.)*

25. Lat.	
Long.	

26. Name of Collector *(type or print)*	27. Initials	28. Telephone Number of Collector

FOR LABORATORY USE ONLY

29. Date Sample Received	30. Date Analyzed	31. Results
32. Laboratory Accession Number	33. Condition of Sample on Receipt	

APHIS FORM 2060 (OCT 99) replaces APHIS FORM 2060 (MAR 94) which is obsolete.

PT. 1 LABORATORY

Front page of APHIS Form 2060, the Environmental Monitoring Form.

Guidelines

Every sample must be accompanied by a completed APHIS Form 2080. The present guidelines are generic and will be superseded by specific instructions included in an Environmental Monitoring Plan for a particular program or operation. If you have any questions about how to fill out the form, or any other questions about monitoring, please call the Environ. Monitoring Team at 301-734-7175.

1. **Program:** Enter the most accurate description, or a commonly used acronym, of program.
2. **State:** The two letter postal abbreviation of the state in which the sample was collected.
3. **County:** The county in which the sample was collected.
4. **Site ID:** Assign a number which uniquely identifies the site (can be alphanumeric).
5. **Date Collected:** The date that the sample was collected.
6. **Time Collected:** The time the sample was collected, using a 24 hour clock.
7. **Sample Description:** Enter what the sample is (e.g., soil, sediment, water, grass, dye card, grasshoppers).
8. **Location:** The distance (in feet) and direction (e.g., 242 degrees as measured with a compass) from the nearest point of the treatment block to the site where the sample was collected.
9. **Pesticide:** The name of the pesticide for which the laboratory should analyze. If analyses for more than one pesticide are necessary, list the other pesticides in the Remarks block.
10. **Formulation:** The formulation of the pesticide used (e.g., emulsifiable concentrate, wettable powder).
11. **Application:**
    - **Method:** The method used to apply the pesticide (e.g., fixed wing aircraft, highboy, backpack sprayer, drench).
    - **Rate:** The rate at which the pesticide is applied (e.g., pounds a.i. per acre).
12. **Sample Type:** Check off the appropriate box: Sample types are usually defined as follows:
    - **Priority:** Samples collected to respond to any reported or observed adverse impact (e.g., bird kill, fish kill, public health concern, property damage).
    - **Routine:** All samples not considered priority samples.
13. **Dates Treatment Applied:** The dates treatments applied. If more than 8, then list additional in Remarks block.
14. **Total Treatments:** Enter the total number of treatments.
15. **Time of Last Treatment:** The time of day that the last treatment was completed (use 24 hour clock).
16. **Soil Type:** Enter the type of soil (e.g., sandy loam).
17. **Land Slope:** Enter the slope, measured from the treatment block to the sample collection site (positive degrees above horizontal for an incline or negative degrees below horizontal for a decline).
18. **Last Rainfall:** The date and amount of the last rainfall before the sample collection.
19. **Wind:** The speed (mph) and direction (e.g., 320 degrees as measured with a compass) from which the wind was coming at the time of the last treatment.
20. **Rel. Humidity:** The relative humidity of the air, measured as a percentage (e.g. 75%) at the time of the last treatment.
21. **Water Body:**
    - **Type:** Examples; pool, lake, river.
    - **Size:** Surface area (acres) or width (feet).
22. **Water:**
    - **Depth:** Average depth (feet).
    - **Velocity:** At the sample collection site (feet per minute).
    - **Temp.:** Water temperature (°F).
    - **pH Values:**
      - **Before:** The pH of the water sample.
      - **After:** If a pH adjustment is required to stabilize the sample, enter the pH of the sample after the adjustment.
    - **Dissolved Oxygen:** Enter the oxygen content of the water sample.
23. **Average Air Temp.:** Enter the air temperature at the time of the last treatment.
24. **Remarks:** Additional information concerning the location of the sampling site (sketch of the site or attach a map), weather conditions (additional wind speeds and directions, gusts, cloud cover), circumstances relevant to the results of the sample analysis, and who to report results to if different from collector.
25. **Latitude and Longitude:** Coordinates of sampling site as determined by GPS unit.
26. **Name of Collector:** Print submitter's name.
27. **Initials:** Submitter's initials in script.
28. **Telephone Number of Collector:** Include area code.

Distribution

Laboratory (original) - submit to the USDA-APHIS National Monitoring and Residue Analysis Laboratory (NMRAL), 3505 25th Avenue, Building 4, Gulfport, Mississippi 39501, c/o Environmental Monitoring Coordinator.

Headquarters (yellow copy) - mail to: USDA-APHIS-PPQ, 4700 River Road, Unit 150, Riverdale, MD 20737, along with any attached maps or other documentation.

Collector (pink copy) - the collector will keep this copy on file for reference.

Sample (blue copy) - package with the individual sample so that if several samples are being shipped in the same container, each form will be associated with it's corresponding sample.

Back page of APHIS Form 2060, the Environmental Monitoring Form