California Environmental Protection Agency
Department of Pesticide Regulation
Environmental Monitoring Branch
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ENVIRONMENTAL MONITORING OF APPLICATIONS OF SECTION 18 INSECTICIDE(S) IN GLASSY-WINGED SHARPSHOOTER TREATMENT PROJECT IN AGRICULTURAL AREAS

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I. INTRODUCTION

The California Department of Food and Agriculture (CDFA) proposes to use ground applications or chemigation of imidacloprid and possibly other insecticides under Section 18 label to control glassy-winged sharpshooter (GWSS) infestations in agricultural areas. The glassy-winged sharpshooter (*Homalodisca coagulata*) is a serious new pest in Central California. It can feed on over 70 species of crop and ornamental plants. It poses a serious threat to the vineyards due to its ability to spread *Xylella fastidiosa*, the bacterium that causes Pierce's disease in grapes. The sharpshooter can also vector diseases to almond, alfalfa, oleander and citrus (UC 1999).

The Environmental Hazards Assessment Program (EHAP) of the Department of Pesticide Regulation (DPR) will conduct monitoring of selected treatments to provide information on the concentrations of the chemical in various environmental media that may include surface, irrigation runoff, and storm runoff water, soil dislodgeable foliar residue, and air. In the event that ecologically sensitive areas are present, toxicity to aquatic organisms will also be determined in surface water.

This proposed monitoring plan will be followed for each application event. More than one application event may be monitored; the total number of events to be monitored will be decided when the extent of the treatment program is known. The final matrices and total numbers of samples collected will be determined once this information is available. The monitoring data will be used by CDFA to assess proper application rate and coverage and to estimate public and environmental exposure to the application.

II. OBJECTIVE

The objectives of this study are to

1) Measure the amount of imidacloprid (or other GWSS Section 18 insecticides) in air, surface, irrigation runoff and storm runoff waters, groundwater, dislodgeable foliar residue, and soil.
2) Measure movement of imidacloprid (or other insecticides of high leaching potential) in soil.

III. PERSONNEL

This study will be conducted by EHAP under the general direction of Kean S. Goh, Ph.D., Agriculture Program Supervisor IV. Key personnel include:

Senior Environmental Research Scientist: John Troiano, Ph.D.
Project Leader: Johanna Walters
Field Coordinator: Roger Sava, Alfredo Da Silva and Cindy Garretson
Laboratory Liaison: Carissa Ganapathy
Analyzing Laboratory: California Department of Food and Agriculture, Center for Analytical Chemistry
Agency and Public Contact: Kean S. Goh at (916) 324-4072, kgoh@cdpr.ca.gov

IV. STUDY DESIGN

Monitoring will be conducted in agriculture areas where chemicals are being applied under US EPA FIFRA, Section 18 specific exemption label to treat GWSS infested agricultural areas. Monitoring in agricultural areas may include the following:

Tank or Drip-line Samples will be collected at the sites selected for monitoring of environmental matrices. This is to ensure that correct rate of chemical has been applied.

Dislodgeable Foliar Residue Samples will be collected if the materials are applied by foliar spray. Prespray, immediately postspray and at elapse of reentry interval will be taken.

Soil/Lysimeter Samples will be collected in the event that chemicals with high leaching potential are used by soil drench, band or furrow application, or chemigation. Data will be used assess the movement of chemical in the soil profile to prevent groundwater contamination.

Ground Water Samples will be collected from wells in proximity to highest application and site with shallowest groundwater. Pre-application samples and post application samples will be collected. Time and number of samples taken will be dependent on the movement of the insecticide as determined by the soil/lysimeter monitoring.

Air samples will be collected for foliar applications only. Samples will be collected in the highest use area to measure ambient insecticide concentrations. The samples will be collected for a 24-hour period before application (background). From the start of application a 24-hour sample will be taken follow by another 24-post-application sampling. Sampling will be timed for peak application period.

Surface waterways containing irrigation runoff will be monitored, both prior to and following applications to determine insecticide concentrations. Additionally, accessible storm runoff sites will be monitored during rain runoff events to determine concentrations due to wash off from exposed surfaces. During the first rain event after the initial application, samples will be collected at points of discharge and/or at areas of concern for aquatic organisms. The number and

frequency of samples collected will depend on availability and sensitivity of water bodies and on the intensity and duration of the runoff event.

Aquatic toxicity. If the application areas have ecologically sensitive site, surface water samples may be tested for aquatic toxicity. DFG will assist in the selection of aquatic species for toxicity testing. The species selected will depend upon the origin of the water samples. Toxicity testing will use U. S. Environmental Protection Agency (1993) and American Society for Testing of Materials (1992) methods. Water quality parameters (alkalinity, hardness, electrical conductivity, ammonia, pH, dissolved oxygen, and water temperature) will also be measured.

V. SAMPLING METHODS

Tank/Drip-line Sample. Distinct well-mixed tank or drip-line sample will be taken. Sample in 1-L plastic bottle will be kept on wet ice until analysis.

Soil. In the event that soil is sprayed, drenched, or chemigated, 2-3 fields with vulnerable soil will be selected. At each field, four soil cores or lysimeter probes will be collected at randomly selected subsites within an application site. Soil cores or lysimeter samples will be collected to a depth of 5 feet or deeper depending on leaching potential of the chemical used. Soil samples will be analyzed at 6-inch intervals and lysimeter samples will be pulled at 1-foot intervals. The soil cores will be placed into a glass jar and sealed with an aluminum foil lined lid (Garretson, SOP FSSO002.00). The number of soil cores collected and corresponding soil weight will be recorded on each sample's chain of custody (COC). Lysimeter water samples will be stored in amber bottles. Soil samples will be stored on dry ice or refrigerated at -20°C until extraction. Lysimeter samples will be stored on wet ice and then refrigerated at 5°C until extraction.

Air. In the event that chemical is applied by foliar spray, centrally located site(s) in the treatment area, will be sampled to measure outdoor ambient air concentrations of insecticide. These sites will be located within a circular area measuring one-half mile in diameter. Sites must also be accessible at all hours, protected from any direct spray, and have electrical power to run the samplers. Air samples will be collected during and for 48 hours following application, according to the following schedule: (1) duration of application plus one hour, (2) duration of 24 hours after application, and (3) another duration of 24 hours.

Samples were collected using XAD- 2 tubes (SKC#226-30-02) and an SKC air sampler (SKC# 224-PCXR8) calibrated at approximately 3 liters-per-minute. Sampler was located outdoors in an open area. Samples were stored on dry ice until delivery to the California Department of Food and Agriculture's (CDFA) Center for Analytical Chemistry for laboratory analyses.

Surface water. Field runoff samples within treated fields may be sampled (Spurlock, SOP FSWA008.00). Surface water samples outside treatment area will be collected using a depth-integrated sampler (D-77) with a 3-liter Teflon® bottle and nozzle. Five to twenty vertical depth integrated samples will be composited at each site. At sites where the water is well mixed, or D-77 sampler cannot be used, due to insufficient water depth or access, a grab sample will be collected (Jones, SOP FSWA003.01). Grab samples will be collected as close to center channel as possible using a 10-liter stainless steel bucket or a grab pole consisting of a glass bottle at the end of a 5-foot pole. Samples will be split into amber glass bottles using a Geotech® 10-port

splitter then sealed with Teflon®-lined lids (Ganapathy, SOP FSWA004). Samples to be analyzed for pesticides will be preserved (if needed) by acidification with 3N hydrochloric acid to a pH between 3.0 to 3.5, and then stored on wet ice or refrigerated at 5°C until extraction (Bradley, SOP FSWA007.00). Toxicity samples if needed will be delivered on wet ice to the CDFG Aquatic Toxicity Laboratory within 30 hours.

Ground Water Sampling will be conducted according to the following SOPs FSWA006 and FSWA001.00 (Marade 1996 and 1998).

VI. CHEMICAL ANALYSIS / TOXICITY TESTING

Chemical analysis will be performed by the CDFA's Center for Analytical Chemistry. Analytical methods are being validated and quality control measures are described in Segawa (1995). In the event that toxicity testing is deemed necessary, DFG's Aquatic Toxicology Laboratory will perform aquatic toxicity tests on surface water samples and measure totals of alkalinity, hardness and ammonia.

VII. DATA ANALYSIS

Concentrations for dislodgeable residues of insecticide in foliage will be reported as micrograms per square centimeter ($\mu g/cm^2$); soil concentrations will be reported as ppm or $\mu g/g$ on a wet weight and dry weight basis. Concentrations of insecticide in air will be reported as both micrograms per cubic meter ($\mu g/m^3$) and parts per trillion (ppt), and water concentrations will be reported as both micrograms per liter ($\mu g/L$) and parts per billion (ppb). When sample size permits, means, percentiles and frequency histograms will be presented. Toxicity data will be presented as percent mortality. Water concentrations will be compared with toxicity data to aid in the interpretation of toxicity test results.

REFERENCES

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