



Department of Pesticide Regulation



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MEMORANDUM

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SUBJECT: PRELIMINARY MONITORING RESULTS OF IMIDACLOPRID AND
CARBARYL APPLICATIONS FOR GLASSY-WINGED SHARPSHOOTER
CONTROL IN RESIDENTIAL AREAS OF IMPERIAL COUNTY (STUDY 197)

Summary

On July 2 and 24 and on August 20, 2002, the Imperial County Department of Agriculture's contract applicator applied imidacloprid and carbaryl to control the glassy-winged sharpshooter (GWSS) in the Paradise Lane, Imperial Spa, and Bombay Beach areas of Imperial County. During this time, the Department of Pesticide Regulation (DPR) took tank, vegetation, surface water, and air samples at several sites in the treatment area. Air samples were taken at two locations, before, during, and after imidacloprid and carbaryl applications. There were no imidacloprid detections in the air, surface water, or vegetation samples. Carbaryl was detected in the post application air sample and in the post application vegetation sample. Tank samples showed concentrations of 0.0022% of imidacloprid active ingredient versus a theoretical concentration of 0.0031% and 0.18% carbaryl active ingredient versus nominal label rates between 0.11% and 0.21%.

Introduction

The Imperial County Department of Agriculture is currently using ground applications of imidacloprid and carbaryl foliar spray and imidacloprid soil injection to control infestations of GWSS. The glassy-winged sharpshooter (*Homalodisca coagulata*) is a serious agricultural pest in California. When feeding, it can transmit Pierce's disease, caused by the bacterium *Xylella fastidiosa*, to grapevines and other diseases to almond trees, alfalfa, citrus, and oleander. First found in the state in 1990, GWSS has spread throughout Southern California and into areas of the San Joaquin Valley.

The Environmental Monitoring Branch of DPR has been monitoring selected treatments in residential areas to provide information on the concentrations of imidacloprid and carbaryl in air, surface water, and vegetation. Additionally, tank samples are taken at each location where air samples are collected. Results reported here are from imidacloprid applications on July 2 and



24, 2002, and carbaryl applications on August 20, 2002, in the Paradise Lane, Imperial Spa, and Bombay Beach areas of Imperial County. Sampling results and related GWSS monitoring reports are also available at DPR's Web site <www.cdpr.ca.gov/docs/gwss>.

Materials and Methods

Pesticide Application- In Imperial County soil injection applications of Merit® 75 WP were made on July 2 and August 20-21, 2002, at Imperial Spa, Fountain of Youth Spa, and in Bombay Beach. Foliar applications of Merit® 75 WP took place on July 24, 2002, to properties at Imperial Spa, Fountain of Youth Spa, and to a residence on Paradise Lane. Foliar applications of "7" Carbaryl Insecticide® were made to properties in Bombay Beach on August 20 and 21, 2002. At Imperial Spa eight spaces were treated for a total of 0.88 acres. At the Fountain of Youth Spa thirty spaces were treated with the Merit soil injection for a total of 3.3 acres and 18 spaces were treated with the Merit foliar spray for a total of 1.98 acres. One residence (0.06 acre) was treated on Paradise Lane. In Bombay Beach 53 residences were treated with the Merit soil injection for a total of 10.5 acres and 52 homes were treated with Monterey 7® carbaryl for a total of 10.26 acres. Imperial County survey crews determined which properties were infested with the GWSS. Applications consisted of an imidacloprid soil injection, an imidacloprid foliar spray and a carbaryl foliar spray. Soil injection applications of Merit® 75 WP, with a 75% active ingredient of imidacloprid, were made by a private pest control operator at a dilution rate of 1.6 ounces per 300 gallons. Pesticide was mixed in water and delivered through a soil injector tool from a truck mounted power rig (consisting of a tank, motor, pressure gun, and pump). Foliar applications of Merit® 75 WP were made at a dilution of 1.6 ounces per 100 gallons of water. Pesticide was mixed in water and delivered through an Orchard Gun with a #12 tip attached to a 175 foot hose from a truck mounted power rig. Foliar applications of "7" Carbaryl Insecticide®, with a 41.2% active ingredient of carbaryl, were made at a dilution of 17 ounces per 50 gallons. Pesticide was mixed in water and delivered through an Orchard Gun with a #12 tip attached to a 175 foot hose from a truck mounted power rig.

Air Sampling- Ambient air samples were collected at one space in Imperial Spa for imidacloprid applications on July 2 and at one residence in Bombay Beach for carbaryl applications on August 20. Background air samples were taken prior to the start of the respective applications on July 1 and August 19, 2002. Air samples at Imperial spa were taken 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, (3) and another duration of 24 hours. Air samples were taken during and for 24 hours following the application in Bombay Beach.

Samples were collected using XAD- 2 tubes (SKC#226-30-02) and SKC air samplers (SKC# 224-PCXR8) calibrated at approximately 3 liters-per-minute. The 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's) Center for Analytical Chemistry for laboratory analyses.

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Imidacloprid on XAD-2 was extracted with methanol and analyzed using High Performance Liquid Chromatography (HPLC) with an ultra violet (UV) detector with a reporting limit of 0.5 µg per sample. Carbaryl on XAD-2 was extracted with methanol and analyzed using HPLC and a fluorescent detector with a reporting limit of 0.2 µg per sample.

Tank Sampling- Tank samples were collected during the treatment at the same locations where the air samples were collected, one sample from the imidacloprid soil injection and the other sample from the carbaryl foliar spray. The samples were taken from the hose end nozzle into a plastic 500-mL container and was stored separate from other samples on wet ice until delivery to the lab for analysis. The tank samples were extracted with methanol and analyzed using HPLC with an UV detector.

Vegetation Residue- Vegetation samples were collected at two sites; one at Imperial Spa where the imidacloprid air sample was collected and the other in Bombay Beach at a residence adjacent to the residence where the carbaryl air sample was collected. Each sample consisted of a minimum of 100 grams of terminal shoots of less than 0.5 cm diameter (generally shoots from secondary or tertiary growth), with leaves included, composited from several oleander plants in close proximity to each other collected into a quart mason jar with a foil lined lid. Samples were collected for total plant residue of imidacloprid (in Imperial Spa) and carbaryl (in Bombay Beach). Background samples were collected prior to applications on July 1 and August 19, 2002. The Imperial Spa sample was collected on July 4, two days after the imidacloprid soil injection application. There was no vegetation sample for the imidacloprid foliar spray. The Bombay Beach sample was collected on August 20, approximately one hour after application when the spray had dried. Samples were taken from a height range of zero to six feet from the ground. Samples were kept frozen until extraction. Oleander vegetation analyzed for imidacloprid was extracted with methylene chloride and analyzed using HPLC with a UV detector with a reporting detection limit of 0.05 ppm. Oleander vegetation analyzed for carbaryl was extracted with methylene chloride and analyzed using HPLC, post-column derivatization and a fluorescence detector with a reporting detection limit of 0.05 ppm.

Surface Water Sampling- Surface water samples were taken at three sites, Pacific Aqua Farm fish ponds on July 3, a creek at a residence on Paradise Lane, and a creek which flows into fish ponds used by Pacific Aqua Farms (downstream of application at Paradise Lane residence) on July 24. All samples were analyzed for imidacloprid. The sample collected at Pacific Aqua Farms was collected following soil injection applications of imidacloprid. The other samples were collected following foliar spray applications of imidacloprid. Background water samples were collected prior to applications on July 1 and July 24.

Samples were taken by filling a one-liter amber bottle directly from the pond or creek and then sealing with a Teflon®-lined lid. Samples were stored on wet ice until delivered to the CDFA Center for Analytical Chemistry for analysis. Imidacloprid in surface water was extracted with

methylene chloride and analyzed using HPLC with an UV detector with a reporting detection limit of 0.05 parts per billion (ppb).

Weather

The weather was generally clear, sunny, and hot on the application day. On July 2 temperatures ranged from 73 to 113 degrees F° with the daily average wind speed of 6 miles per hour (mph) from the west. On July 24 temperatures ranged from 82 to 106 degrees F° with the daily average wind speed of 5 mph from the west. On August 20 temperatures ranged from 76 to 105 degrees F° with the daily average wind speed of 6 mph from the south.

Results and Discussion

Air- A total of four air samples were analyzed for imidacloprid. There were no detections of imidacloprid in the air samples. A total of three samples were analyzed for carbaryl. The background and during application samples had no detectable residues of carbaryl. The 24-hour sample following the application sample recovered 0.612 $\mu\text{g}/\text{m}^3$ carbaryl.

Since enforceable human health standards for carbaryl ambient air concentrations do not exist, DPR has developed screening levels to place results in a health-based context. Although not regulatory standards, DPR uses these screening levels to evaluate the results and take actions as needed. These screening levels represent the first tier in a risk evaluation and provide a context in which to view measured levels of pesticides in this project. A measured air level that is below the screening level for a given pesticide would not be considered to represent a significant health concern and would not generally undergo further evaluation, but should not automatically be considered "safe." By the same token, a measured level that is above the screening level would not necessarily indicate a significant health concern. This set of monitoring data is a measurement of acute exposure to carbaryl. The screening level for acute exposure to carbaryl is 25 $\mu\text{g}/\text{m}^3$. The concentration detected, 0.612 $\mu\text{g}/\text{m}^3$, is well below the screening level and does not represent a significant health concern.

Tank Mix- Two tank samples were collected, one from the imidacloprid soil injection on July 2 and the other from the carbaryl foliar spray on August 20. Tank sample results were 0.0022% active ingredient of imidacloprid and 0.18% active ingredient of carbaryl. Theoretical calculation of 1.6 ounces of Merit® 75 WP (75% active ingredient) in 300 gallons of water is 0.0031% imidacloprid. Label rates for "7" Carbaryl Insecticide®, active ingredient of 41.2%, generally range from 2 to 4 teaspoon (tsp.) per gallon of water for most vegetables, berries, and fruit and nut trees. For control of leafhoppers on trees and ornamentals the label reports a rate of 2 tsp. per gallon of water. Theoretical calculations of percent active ingredient for 2 tsp. and 4 tsp. of product per gallon of water are 0.11% and 0.21% active ingredient, respectively.

Vegetation Samples- Vegetation samples were collected at two sites; one at Imperial Spa where the imidacloprid air sample was collected and the other in Bombay Beach at a residence adjacent

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to the residence where the carbaryl air sample was. The background and post application samples collected at Imperial Spa had no detectable amount of imidacloprid. The post application sample collected in Bombay Beach had residue of 174 ppm carbaryl.

Surface Water- A total of five surface water samples were taken before and after treatments in Imperial Spa and Paradise Lane on July 3 and July 24, respectively. No imidacloprid was detected in any samples.

bcc: Walters Surname File

Imidacloprid and Carbaryl Monitoring Sites in the Glassy-winged Sharpshooter Treatment Areas, Imperial County, Calif., 2002

