



Department of Pesticide Regulation



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MEMORANDUM

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

SUMMARY

During November 2000, the Butte County Department of Agriculture's contract applicators and the California Department of Transportation (Caltrans) applied carbaryl to control the glassy-winged sharpshooter in Chico, California. During this time, the Department of Pesticide Regulation (DPR) took air, tank, leaf, and water samples at several sites in the treatment area. Air samples were taken at one location, before and during carbaryl applications. No carbaryl was detected in the air monitoring. Tank samples showed concentrations of 0.14% and 0.15% of carbaryl active ingredient which were within the label rate concentrations of 0.11% to 0.21%. Dislodgeable foliar residue from leaf punches had concentrations of 2.14 and 3.79 $\mu\text{g}/\text{cm}^2$ for carbaryl on crepe myrtle and oleander, respectively. The six water samples collected from little Chico Creek and Comanche Creek had no detections of carbaryl.

INTRODUCTION

The County Department of Agriculture and Caltrans used ground applications of carbaryl to control infestations of the glassy-winged sharpshooter (GWSS). The GWSS (*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 and Sacramento Valleys.

The Environmental Hazards Assessment Program (EHAP) of DPR has been monitoring selected treatments in residential areas to provide information on the concentrations of carbaryl in air, surface water, leaves, and representative backyard fruits and vegetables. Additionally, tank samples are taken at each location where air samples are collected. Results reported here are



from applications on November 5, 2000, in Chico, Butte County. Sampling results and related GWSS monitoring reports are also available at DPR's website <www.cdpr.ca.gov/docs/gwss>.

MATERIALS AND METHODS

Pesticide Application

In Butte County approximately 190 acres of highway, businesses, park, curbside, and parking lots were sprayed. One application was made over the course of one day, November 5, 2000. Caltrans, starting at approximately 1 AM on November 5, 2000 made applications to Highway 99. Carbaryl applications by the county made to businesses, parking lots, curbsides, and to a small area in a public park began around 5 AM November 5, 2000. Butte County survey crews determined which properties were infested with GWSS. Applications of "7" Carbaryl Insecticide®, with a 41.2% active ingredient were made by two private pest control operators. Pesticides were mixed in water at a rate of one quart "7" carbaryl in 100 gallons of water and delivered through a # 8 and #12 DX spray gun (manufactured by Spraying Systems). The spray gun was attached to a hose from a truck mounted power rig (consisting of a tank, motor, pressure gun, and pump). Pressure was maintained around 65 psi (pounds per square inch) at the spray gun.

Air Sampling

Ambient air samples were collected at one site in Chico at a self-storage facility on Whitman Avenue. The carbaryl application was made to this site approximately two hours after spraying began.

Two background air samples were taken prior to any applications to the area on November 4, 2000. The first air sample started and ended on November 4, 2000 to ensure no conflict with Caltrans applications. The second background air sample was started November 4, 2000 and ended November 5, 2000 before the county started applications. Air samples 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, 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. Carbaryl in XAD-2 was extracted with methanol and analyzed using high performance liquid

chromatography (HPLC) with a fluorescence detector with a reporting detection limit of 0.2 µg per sample (reliable detection level).

Tank Sampling

Two tank samples were collected on November 5, 2000 from the two pest control operators. One sample was taken at the air monitoring site and the other was taken at the northwest corner of the Chico Mall parking lot. Samples were taken from the hose nozzle into a plastic 500-mL container. Samples were stored separate from other samples on wet ice until delivery to the lab for analysis. Tank samples are extracted with methanol and were analyzed using HPLC with an ultra violet detector.

Surface Water Sampling

Surface water samples were collected at two sites. Background water samples were taken prior to the beginning of application on November 4, 2000 at Little Chico Creek at Bruce Sreet and at Comanche Creek at Paseo Companeros. Application samples were taken on November 5, 2000 approximately four hours after applications began in the area. Additional samples were taken during a rain event on November 13, 2000. Rinse blanks were taken at both locations.

Samples at Comanche Creek were taken by filling a ten-liter stainless steel bucket directly from the creek. Samples were then poured into one-liter amber bottles, acidified to a pH of 3.0 to 3.5, then sealed with a Teflon®-lined lid. Samples at Little Chico Creek were taken by submerging a one-liter amber bottle directly into the creek, acidified to a pH of 3.0 to 3.5, then sealed with a Teflon®-lined lid. Quality control samples consisted of field blanks taken at the time of sampling to ensure no contamination occurred. Samples were stored on wet ice until delivered to the CDFA Center for Analytical Chemistry for analysis. Carbaryl in surface water was extracted with methylene chloride and analyzed using HPLC with a fluorescence detector. The reporting detection limit is 0.05 ppb (parts per billion).

Leaf Sampling

Leaf samples were collected at two sites; Community Park and the northwest corner of the Chico Mall parking lot. Each sample consisted of 40 one-inch-diameter leaf punches collected into a 4-ounce glass jar and sealed with a Teflon®-lined lid. Samples were collected after the spray had dried (generally two and a half hours after the application had occurred). Leaf punches were collected from one type of plant, crepe myrtle in Community Park and oleander in Chico Mall. Samples were collected from a height range of zero to six feet. Samples were stored on wet ice and delivered within 36 hours to the CDFA Center for Analytical Chemistry and analyzed for dislodgeable foliar residue. Leaf samples were washed with Surten®, extracted with methylene

chloride, and analyzed using HPLC with a fluorescence detector. The reporting detection limit is $0.0012 \mu\text{g}/\text{cm}^2$ (micrograms per centimeter square).

Produce Sampling

No produce sampling occurred during this application due to lack of available produce.

Weather

On November 5, 2000 temperatures ranged from 45 to 72 degrees and the daily average wind speed was 2 miles-per-hour (mph) from the north, skies were mostly clear. On November 13, 2000 temperatures ranged from 29 to 46 degrees with the daily average wind speed of 3 mph from the southeast and 0.21 inches of rain fell over the 24-hour period. Rain also fell on November 9, 2000 before rain runoff samples were collected. Weather data are from CIMIS station #12, Durham (UCD, 2000).

RESULTS and DISCUSSION

Air

All air samples had no detectable amount of carbaryl at the reporting limit of $0.5\mu\text{g}$ per sample.

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 $51.7 \mu\text{g}/\text{m}^3$ (6,313 ppt) over a 24-hour period (J. Sanborn, 2000).

Tank Mix

Tanks sample results were 0.14 and 0.15% active ingredient of carbaryl for the Whitman Ave. and Chico Mall samples, respectively. Label rates for "7" Carbaryl Insecticide®, active ingredient of 41.2%, generally range from 2 to 4 tsp (teaspoon) per gallon of water for most vegetables, berries, and fruit and nut trees. For control of leafhoppers on trees and ornamentals

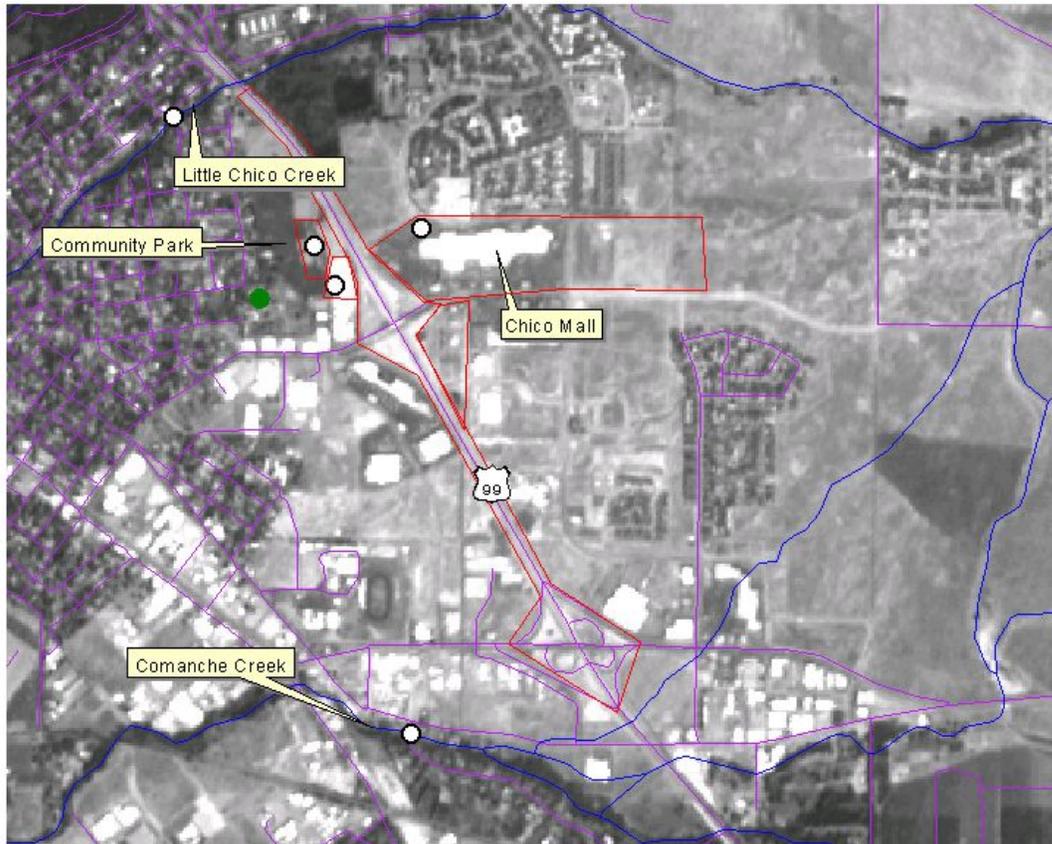
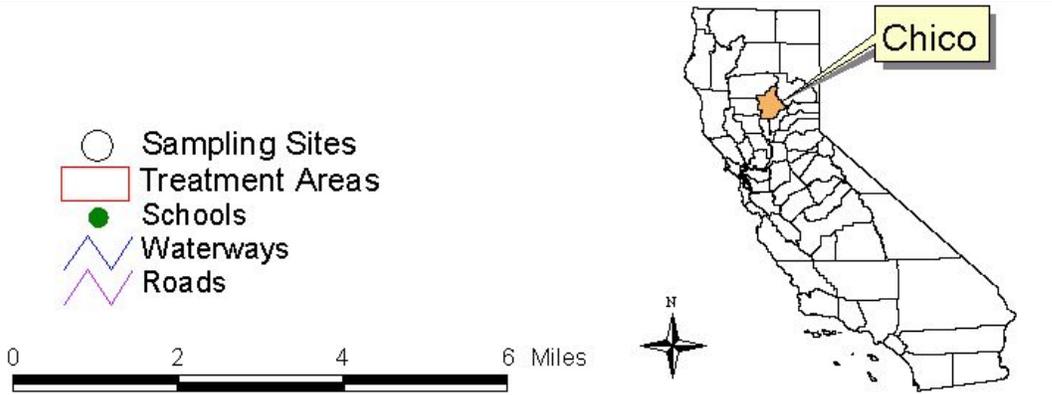
the label reports a rate of 2 tsp per gallon of water. Theoretical calculations of percent active ingredient for 2 teaspoons and 4 teaspoons of product per gallon of water are 0.11% and 0.21% active ingredient, respectively.

Surface Water

All surface water samples collected had no detectable amount of carbaryl at a detection limit of 0.05ppb. The California Department of Health Services' drinking water health advisory level for carbaryl is 60 ppb (CDHS, 2000) and the 96-hour LC₅₀ for rainbow trout is 1.4 ppm (CDPR, 2000).

Leaf Samples- The two post application leaf punch samples had residues of 2.14 and 3.79 $\mu\text{g}/\text{cm}^2$ for carbaryl at the Community Park and Chico Mall, respectively. These concentrations were below safe reentry levels reported to range from 2.4 to 5.6 $\mu\text{g}/\text{cm}^2$ carbaryl for the harvest of citrus (Iwata et al., 1979).

Carbaryl Monitoring Sites in the Glassy-winged Sharpshooter Treatment Areas, Chico, Butte County, Calif., 2000



References

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