This study was not initiated because a method with adequate sensitivity could not be developed.

Protocol Attached.

California Environmental Protection Agency
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STUDY 208: TRANSLOCATION OF SOIL-INJECTED IMIDACLOPRID IN ORNAMENTAL PLANTS IN GLASSY-WINGED SHARPSHOOTER TREATMENT AREAS

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I. INTRODUCTION

The California Department of Food and Agriculture (CDFA) has been using soil-injected imidacloprid to control glassy-winged sharpshooter (GWSS) infestations in urban 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 current GWSS infestations in Northern California are in seven counties: Kern, Tulare, Fresno, Santa Clara, Contra Costa, Sacramento, and Butte. Application sites in these counties are either agricultural, urban, or a mixture of both. The Environmental Hazards Assessment Program (EHAP) of the Department of Pesticide Regulation (DPR) has monitored applications in residential areas involving several chemicals and application techniques to provide information on the concentrations of the chemicals in various environmental media. Currently there is limited information available on the movement and residues of imidacloprid in plants that have been soil-injected. A study conducted by Bayer Corporation on three species of conifers indicated that two to three months may be required for adequate concentrations of imidacloprid to translocate through large trees when soil applied (Tattar *et al*, 1998). This study did not determine how long the imidacloprid residues remained in the plants at lethal concentrations.

During the course of this study EHAP will conduct monitoring of soil-injected imidacloprid to provide information on the concentrations of imidacloprid in terminal shoots of ornamental plants. The monitoring data will be used by CDFA to assess efficacy and to quantify translocation of soil-injected imidacloprid in ornamental plants.

II. OBJECTIVE

The objective of this study is to quantify translocation of soil-injected imidacloprid in ornamental plants.

III. PERSONNEL

This study will be conducted by EHAP under the general direction of Randy Segawa, Senior Environmental Research Scientist (Supervisor). Key personnel include:

Project Leader: Johanna Walters
Senior Environmental Research Scientist: Frank Spurlock, Ph.D.
Field Coordinator: Heather Casjens
Laboratory Liaison: Carissa Ganapathy
Statistician: LinYing Li
Analyzing Laboratory: APPL Lab, Fresno
Collaborator: Kevin O'Day, Santa Clara County Department of Agriculture
Sponsor: Sean Hardy, Department of Food and Agriculture
Agency and Public Contact: Randy Segawa at (916) 324-4137, rsegawa@cdpr.ca.gov

IV. STUDY DESIGN

Monitoring will take place in the San Jose region of Santa Clara County. Data collected will include the following:

Vegetation samples will be collected from two plant types (Crape myrtle and waxleaf privet) in both irrigated and non- irrigated conditions. The samples will consist of terminal shoots with any leaves cut off from the shoots. Samples will be analyzed for total residue of imidacloprid.

Soil samples will be taken and analyzed for soil moisture prior to application and at each sampling interval. One-time soil observations will include soil type, texture, and structure at each sample location.

Insect presence will be recorded. The presence of glassy-winged sharpshooter and other phytophagous insects will be recorded at the time of each sampling.

Chemical application information will be recorded to include: type and dilution rate of chemical used, amount of liquid injected, depth of injection, type of injection equipment, and time of application.

Meteorological conditions will be collected from the nearest weather station. Data collected will include solar radiation, evapotranspiration, temperature, and rainfall for the extent of the sampling period.

V. SAMPLING METHODS

Vegetation Sample. Vegetation samples of two types of plants will be collected in irrigated and non-irrigated conditions. The plant material collected will consist of 100 grams of terminal shoots, with leaves discarded, of less than 0.5 cm diameter (generally shoots from secondary or tertiary growth). Each sample will consist of composited material from three to five similar plants in close proximity to each other. Three replicate samples will be taken for each type of plant in both of the growing conditions. Samples are collected by cutting the shoots into glass jars using a pre-cleaned cutting tool and recording the weight. Samples will be stored on dry ice and kept frozen until extraction. Samples will be collected for 8 sampling periods at 1, 2, 4, 8, 12, 16, 20, and 24 weeks after application and thereafter monthly until imidacloprid is no longer detectable (< 0.1 part per million). Information will be collected on plant type, plant height, girth at 5 feet from the ground, growth stage, and sun exposure (i.e. full or partial sun and direction of exposure).

2 plant types x 2 conditions x 3 replicates x 48 sampling periods = 96 total samples

Soil sample. Soil moisture samples will be collected in accordance to the Standard Operating Procedure for soil water content determination (Garretson, 1999). Samples will be collected prior to application and then at each vegetation sampling interval. Samples will be collected by compositing soil of a depth of at least 6 inches from around each plant sampled for vegetation. Each vegetation sample will have an associated soil sample. Soil is collected in ½ pint wide mouth mason jars and the weight is recorded. Sample is stored at room temperature until ready to proceed with drying. Water content is determined by using the equation:

$$\text{Water content\%} = (M_w - M_d)/ M_d \times 100$$

M_w = Mass of wet soil sample

M_d = Mass of dry sample

Total samples = 96

Insect presence. The presence of glassy-winged sharpshooter and other phytophagous insect will be recorded while collecting each sample. Insect presence will be determined by a visual survey of 3 randomly selected terminal shoots on each plant sampled.

VI. CHEMICAL ANALYSIS

APPL Lab, Fresno will perform the chemical analysis.

VII. DATA ANALYSIS

Concentrations for total residue of imidacloprid will be reported as parts per million (ppm) of wet weight basis and soil moisture will be reported as percent water content. Means, percentiles, and standard deviations will be presented. Total residues will be compared with soil moisture content and insect presence to aid in the interpretation of the results.

Regression and analysis of variance will be used to quantify the decline of concentration with time and to determine whether plant species and irrigation cause significant differences in translocation of imidacloprid.

REFERENCES

Garretson, C. 1999. Soil Water Content Determination. California-EPA/ Department of Pesticide Regulation. Environmental Hazards Assessment Program. SOP METH001.00.

Tattar, Terry A., Jim A. Dotson, Michael S. Ruizzo, and Bruce Steward. Translocation of Imidacloprid in Three Species When Trunk- and Soil-Injected. Journal of Arboriculture 24(1): January 1998.

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