

Department of Pesticide Regulation
Environmental Monitoring and Pest Management
1220 N Street, Room A-149
Sacramento, CA 95814

Protocol for Monitoring Diazinon in the Fruit Fly
Eradication Soil Treatment Program, Santa Clara County, 1992.
August 1, 1992

I. INTRODUCTION

Soil treatment with diazinon is used in exotic fruit fly eradication programs to kill pre-pupal to adult emergent stages in the soil. Diazinon 4EC or AG500 is sprayed at a rate of 5 lb ai/a (5.6 kg/ha) on the ground under the host tree canopy from the trunk to the drip line, and then watered in with approximately one inch or less of water just before puddling or run-off occur. A treatment program consists of three diazinon applications made at 14 day intervals.

Potential exposure of children exists via dermal and oral routes to soil and turf-applied diazinon during the fruit fly eradication programs in northern California. Diazinon residues from soil applications (using mostly granular formulation) were previously monitored in Sacramento County during the Japanese beetle eradication program (Segawa and Powell 1989). The highest diazinon residues found were in the turf/thatch (21 to 1700 mg/sq m) and upper soil layers (12 to 610 mg/sq m) at one day after application. Diazinon was not detected after 21 days. Investigations on the fate of chlorpyrifos and dichlorvos applied to soil/turf showed that these insecticides dissipated to "estimated safe re-entry level" within 2-6 hours after application on various types of turf (Goh et al. 1986 a,b).

This study is being conducted to monitor the levels and estimate the dissipation rates of diazinon and diazoxon on turf/thatch, and surface soil under field conditions during a fruit fly eradication program in Los Angeles County. The data will be available for more realistically assessing the potential risk associated with exposure.

II. OBJECTIVE

To quantify over time the amounts of diazinon and diazoxon on turf/thatch and surface soil during a fruit fly eradication program in Los Angeles County.

III. PERSONNEL

This study will be conducted by the Environmental Hazard Assessment Program (EHAP) under the general direction of Dr. Kean S. Goh, Supervisor. Key personnel are listed below:

Project Leader: Clarice Ando

Field Operations: Carissa Gana, Jesse Leyva, Rosemary Neal

Senior Staff Scientist: John Troiano

Lab Liaison/Quality Assurance: Nancy Miller

Chemical Analysis: Paul Lee

Soil Characterization: Cindy Garretson

Experimental Design/Data Analysis: Sally Powell

Public and Agency Information: Madeline Ames

Questions concerning this monitoring program should be directed to Madeline Ames at (916) 654-1141 and FAX (916) 654-0539.

IV. SAMPLING PLAN

Eight diazinon treated sites, each located directly under a host tree, will be chosen: four sites with turf and four sites with bare ground. At each site, two 2x2 sq ft (0.37 sq m) sub-areas will be randomly chosen and marked. Each treatment involves three separate diazinon applications at 14 day intervals, and the proposed sampling schedule will be:

Application 1: Background and Day 0

Application 2: Background and Day 0

Application 3: Background, Days 0, 1/2, 1, 2, 4, 8, 16 and 32.

On each sampling date, three 6-cm diameter cores of turf or bare soil will be taken from each sub-area using a steel cylinder corer. Soil samples will be split after the third application on days 0, 1, 2 and 8 for analysis by a second laboratory. Six soil cores will be taken on these days. For turfed sites, approximately 50 g of turf/thatch will be sampled, and for bare ground sites approximately 100 g of soil will be sampled from the top 1 cm. An additional 10 g turf/thatch sample will be taken for moisture determination at each site at each sampling date. Approximately 100 g of soil at each site will be taken for soil texture, pH, and organic carbon determination. These samples will be taken on two background dates for applications 1 and 3 (total of 8 samples). The three cores from each sub-area will be composited according to matrix type.

Total samples: 224 chemical + 112 physical = 336 samples

Turfed sites: 4 sites x 2 sub-areas x 13 dates = 104

Bare sites: 4 sites x 2 sub-areas x 13 dates = 104

QC split soil-samples: 4 sites x 1 sub-areas x 4 dates = 16

Texture, organic carbon, pH soil: 4 sites x 2 dates = 8

Turf/thatch moisture: 8 sites x 13 dates = 104

V. CHEMICAL ANALYSIS

Turf/thatch samples will be analyzed for dislodgeable and total residues, and soil will be analyzed for total residues. Split soil samples on selected days will be analyzed by a second lab. Fresh weight for total sample, and moisture content for turf/thatch and soil will be determined by the main lab. Particle-size analysis to determine soil texture will be conducted using the hydrometer method (Bouyoucos, 1962), while soil organic matter will be determined using dichromate reduction with silver sulfate (Rauschkolb, 1980). Soil pH will also be reported.

VI. DATA ANALYSIS

Residues will be expressed as wt/wt of sample and wt/surface area of cores on both dry- and wet-weight bases. Dissipation curves for dislodgeable and total diazinon and diazoxon residues will be estimated, as well as means and 95% confidence intervals for each sampling date.

VII. REFERENCES

Bouyoucos. G.J. 1962. Hydrometer method improved for making particle size analyses of soils. *Agronomy J.*, 54:464-465.

Goh, K.S., S. Edmiston, K.T. Maddy, D.D. Meinders, S. Margetich. 1986. Dissipation of dislodgeable foliar residue of chlorpyrifos and dichlorvos on turf. *Bull Environ Contam Toxicol* 37:27-32.

Goh, K.S., S. Edmiston, K.T. Maddy, S. Margetich. 1986. Dissipation of dislodgeable foliar residue for chlorpyrifos and dichlorvos treated lawn: implication for safe reentry. Bull Environ Contam Toxicol 37:33-40.

Rauschkolb, R.S. 1980. Soil analysis method S:18.0, Organic matter dichromate reduction. In California Fertilizer Association, California Soil Testing Procedures Manual.

Segawa, R., S. Powell. 1989. Monitoring the pesticide treatments of the Japanese beetle project, Sacramento County, California, 1983-1986. Vol. III: diazinon. Environmental Hazard Assessment Program, Calif Dept of Food and Ag, Sacramento, CA, EH89-5, 44pp.