EXECUTIVE SUMMARY
of Report EH 93-01 Entitled
"Monitoring Diazinon in the Mediterranean Fruit Fly
Eradication Soil Treatment Program,
Los Angeles County, California, 1992"

Environmental Monitoring and Pest Management Branch
Department of Pesticide Regulation

PURPOSE

Since no specific residue monitoring has been done for diazinon during past fruit fly eradication projects, this study was conducted to measure over time the amounts of diazinon and diazoxon (a compound that has been chemically transformed from the parent compound, diazinon) on turfgrass and surface soil during a fruit fly eradication program. This data will be used for exposure assessment by the Department of Pesticide Regulation.

BACKGROUND

Soil treatment with diazinon is used in exotic fruit fly eradication programs by California Department of Food and Agriculture (CDFA) to kill pre-pupal to adult emergent stages of the insect in the soil. Diazinon is sprayed on the ground under the host tree canopy from the trunk to the drip line, and then watered in to a point before puddling or runoff occurs. A treatment program consists of up to three diazinon applications made at 14-day intervals.

People may be potentially exposed to diazinon through the skin or ingestion if they contact soil and turf to which diazinon has been applied during a fruit fly eradication program. No specific residue monitoring has been done for diazinon during past fruit fly eradication projects. Residue monitoring has been done in association with diazinon applications for Japanese beetle.

This study was conducted to monitor the levels and estimate the changes in concentration over time of diazinon and diazoxon on turfgrass and surface soil under field conditions during a fruit fly eradication program in Duarte, Los Angeles County.

STUDY METHODS

During September and October, 1993, Environmental Hazards Assessment Program scientists selected four soil and four turf sites beneath trees for long-term monitoring in CDFA eradication project.

Two small subsites were randomly located under the tree canopy of each of the eight sites and samples were collected from the subsites during the monitoring. Samples of surface soil (soil within 1 cm of surface) and turfgrass were collected just before (background samples) and approximately one hour after (Day 0 samples) each of the three diazinon applications that comprised a treatment. Additional samples of both soil and turf were collected up to 33 days following the third, final diazinon application.

RESULTS

Diazinon residue levels for both media were inexplicably lower for the third application than for the levels reported for either applications one or two. The pesticide deposition rate and the amount of water applied to the sites after pesticide application were not quantified during the study, and consequently, values could not be compared to identify if these or other factors were responsible for the observed residue differences between applications. Also, the diazinon quality contol data associated with the third application suggested possible analytical problems. Due to the uncertainness of the data collected from the third application, it is suggested that data from the first and second applications be more appropriate for estimating exposure.

Soil: One-hundred and four samples were collected from September 27 to November 29, 1993, and were analyzed for diazinon and diazoxon residues. Diazinon was not detected in soil before the first ground application. Within approximately one hour after the first application, diazinon concentrations increased to 17.10 micrograms (µg) diazinon per gram (g) soil, which is equivalent to 17.10 ppm. This value was the highest diazinon level reported in soil throughout the entire monitoring period.

After the final application, changes in concentrations over time were measured. From day zero to day three of the third (and final) application, diazinon levels decreased from 1.87 µg/g (1.87 ppm) soil to 0.38 µg/g (0.38 ppm) soil and remained at approximately that level to the end of the 33-day sampling period.

Of the 104 surface soil samples collected, only eight contained detectable levels of diazoxon. Seven of the eight detections were reported just after the first application. These values ranged from 0.0048 (0.0048 ppm) to a high of 0.0194 µg diazoxon/g (0.0194 ppm) soil.

Turf: The greatest amount of dislodgeable residues of diazinon was 144.36 µg/g (144.36 ppm) turf, which was reported for the second application. Dislodgeable residues of diazoxon were also highest at this sampling period with the diazoxon concentration reported at 0.59 µg/g (0.59 ppm) turf.

Data collected from monitoring which followed the third application indicated a decrease in dislodgeable residues of diazinon and diazoxon over the three days following the third application with levels declining from 36.48 (36.48 ppm) to 5.12 µg diazinon/g (5.12 ppm) turf and from 0.35 (0.35 ppm) to 0.05 µg diazoxon/g (0.05 ppm) turf. Dislodgeable concentrations for both compounds remained at approximately these lowest levels during the rest of the 33-day sampling period.

CONCLUSIONS

The highest diazinon residues in soil were detected immediately following the first soil application. The results from this study do not indicate any significant accumulation of diazinon in soil or turfgrass with each successive spray. Diazinon appeared to dissipate gradually following the third application, although residues remained detectable over the 33-day period following the third application. Since diazoxon detections occurred almost exclusively in samples immediately following the first application, this would indicate

that analysis in soil should be limited to diazinon since diazoxon was not frequently detected.

Dislodgeable residues of both diazinon and diazoxon were present on turf up to 33 days after the last application.

These data should be used with discretion for exposure assessement due to the inexplicable low residue values obtained after the third application and due to the laboratory quality control data, which suggested possible analytical problems during this same period. For exposure assessment, it is suggested that data from applications one and two be utilized.

It is recommended that additional monitoring of future diazinon treatment programs be conducted for both soil and turf in a sequence of three diazinon applications since the highest detectable levels of diazinon may be found in any one of the three applications. This additional data may be used in estimating exposure and determining dissipation rates.

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