California Department of Food and Agriculture
Environmental Monitoring and Pest Management
1220 N Street, Room A-149
Sacramento, CA 95814

PROTOCOL FOR MONITORING MALATHION IN THE MEDITERRANEAN FRUIT FLY AERIAL TREATMENT PROGRAM, SOUTHERN CALIFORNIA, 1990

February 8, 1990

I. INTRODUCTION

An aerial treatment program with malathion has been used previously to eradicate Mediterranean fruit fly (Medfly) infestations within California. The Environmental Hazards Assessment Program (EHAP) of the California Department of Food and Agriculture (CDFA) quantitatively characterized the weekly aerial applications of malathion used to eradicate the Mediterranean fruit fly in the Santa Clara Valley in 1981 (Oshima, et al., 1982). Monitoring showed that aerial application deposited an average amount of 1385 micrograms of malathion per square foot of ground surface area ($\mu g/ft^2$). Malathion droplets ranged between 35 and 1750 microns (μ) in diameter. Air monitoring of malathion indicated that gas phase levels never exceeded one microgram per cubic meter ($\mu g/m^3$), well within the parts per trillion range. The water concentration of malathion found in bodies of water in the area of the application averaged less than 10 parts per billion (ppb).

The purpose of this year's monitoring is limited to determining if the ranges of environmental concentrations are similar to those of 1981. This monitoring will not attempt to recharacterize the applications, since this was done in the 1981 monitoring program.

II. OBJECTIVE

To determine if the amount of pesticide reaching the ground (mass deposition), droplet size, air and water concentrations of malathion and malaoxon from aerial applications used to eradicate the Medfly in 1990 are similar to those documented during the 1981 program.

III. PERSONNEL

This study will be conducted by the EHAP. Key personnel are listed below.

Project Leader - Randall Segawa

Senior Staff Scientist - Heinz Biermann

Field Operations - Bonnie Turner

Lab Liaison/Quality Control - Nancy Miller

Chemical Analysis - Jane White

Data Analysis - Sally Powell

Information Officer - Gera Curry

Questions concerning this monitoring program should be directed to Gera Curry at (916) 445-3588.

IV. MONITORING PLAN

Currently, a period of eight days are required to complete one application. Four of these eight days during the next application (scheduled for February 12 - 22, 1990), and one day during each of the subsequent applications through April will be monitored. Additional sampling may be conducted depending on results of this monitoring. For each day monitored the following samples will be collected:

Air - Three sites will be monitored to determine the amount of malathion and malaoxon in air. One of the sites will be a "sensitive" site such as schools, hospitals, playgrounds, or nursing homes. The other two sites

will be private residences. All sites will be monitored for outdoor air concentrations and at least one site will be monitored for indoor air concentrations. A series of four samples will be collected at each of the three sites: a background sample before application (24-h duration), a spray sample during application (duration of that night's spray), a post-spray sample immediately after application (24-hr duration), and a second post-spray sample the day after application (24-hr duration).

4 sites (3 outdoor + 1 indoor) X 4 sampling intervals = 16 samples

Water - Two sites will be monitored to determine water concentrations of malathion and malaoxon after direct application. Uncovered pools, fountains, ponds, or other shallow water bodies will be sampled. Four samples will be collected at each site, two before application and two after application.

2 sites X 2 sampling intervals X 2 reps = 8 samples

Mass Deposition - Twenty sites within the application area will be sampled during application to determine the amount of pesticide reaching the ground. Five of the sites will be the air and water monitoring sites described above. The other 15 sites will be a mixture of various properties (e.g., private residences, commercial establishments, government facilities).

20 sites X 1 sampling interval = 20 samples

Droplet Size - The same 20 sites sampled for mass deposition will also be sampled to determine the size of the droplets reaching the ground.

20 sites X 1 sampling interval = 20 samples

Additional Monitoring

Additional samples will be collected independent of the normal monitoring described above. This monitoring may require the cooperation of other agencies.

Rain Runoff - A minimum of two storm drain sites will be monitored during rainfall to determine pesticide concentrations due to wash off from surfaces. The number and frequency of samples collected will depend on intensity and duration of the storm. All samples will be analyzed for malathion and malaoxon.

"Sensitive" Area Monitoring - Selected "flagged" or other "sensitive" areas will be monitored (e.g., fish or wildlife areas, drinking water supplies).

V. SAMPLING METHODS

The same general methods of Oshima, et al. (1982) will be used.

VI. CHEMICAL ANALYSIS

All samples will be analyzed for malathion and malaoxon (oxidation product) by the CDFA Chemistry Laboratory Services Branch. Standard EHAP quality control measures will be used (Environmental Hazards Assessment Program, 1988).

VII. DATA ANALYSIS

For air concentration, mass deposition, and droplet size, the relative frequency of distributions for the seven days monitored will be plotted over the graph of the relative frequency distribution from 1981 (the combined data for all six sprays) for graphic comparisons of the distributions.

VIII. TIMETABLE

The timetable given below is only tentative and may change due to weather or other factors.

Begin to locate sampling sites	February 5, 1990
Begin field sampling	February 12, 1990
Begin chemical and droplet size analysis	February 14, 1990
Begin data analysis	February 20, 1990
Report first set of results	February 26, 1990
Complete field sampling	April 30, 1990
Complete chemical and droplet analysis	May 11, 1990
Complete data analysis	May 31, 1990
Complete report	June 30, 1990

IX. REFERENCES

Environmental Hazards Assessment Program. Chemistry Laboratory Quality Control Guidelines. California Department of Food and Agriculture. 1988.

Oshima, R.J., et al. A Characterization of Sequential Aerial Malathion Applications in the Santa Clara Valley of California, 1981. California Department of Food and Agriculture. 1982.