

California Department of Food and Agriculture
Environmental Monitoring and Pest Management
1220 N Street, Room A-149
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DRAFT PROTOCOL
AN EXPERIMENT TO DETERMINE MASS DEPOSITION
OF DIAZINON WITH AND WITHOUT DORMANT SPRAY OIL
ON OFF-TARGET SURFACES

I. INTRODUCTION

Organophosphate pesticides were recently discovered as inadvertent residues on vegetable crops in Stanislaus County by the California Department of Food and Agriculture's Pesticide Use Enforcement Branch. Subsequently, the Environmental Hazards Assessment Program (EHAP) of CDFA conducted a study which confirmed the presence of diazinon, as well as other organophosphate pesticides, in experimental vegetation at various sites in Stanislaus County near orchards where these pesticides were used as dormant sprays. Although it is unknown how the pesticides are transferred into fog or air after application, dormant oil sprays may have an effect on the rate of deposition to off-target surfaces.

II. OBJECTIVES

The objective of this experiment is to determine if dormant spray oil has an effect on deposition of an organophosphate pesticide on off-target vegetation.

III. PERSONNEL

This experiment will be conducted by the California Department of Food and Agriculture's (CDFA) Environmental Hazards Assessment Program (EHAP). Key EHAP personnel are listed below:

Bonnie Turner - Project leader

Sally Powell - Experimental design/statistical analysis

Clarice Ando - Field coordinator

Nancy Miller - Lab liaison

Jane White - Chemical methods/analysis

Public/agency liaison - Madeline Ames

All questions concerning this project should be directed to Madeline Ames at 916-324-8916 or ATSS 454-8916

IV. EXPERIMENTAL DESIGN/STATISTICAL ANALYSIS

Diazinon will be applied to a wooden lattice framework in two treatments: 1) with dormant spray oil and water, and 2) with water only. Five replications will be made of each treatment. The wooden framework (Figure 1) will surround experimental vegetation in pots (parsley or dill) from which samples to be analyzed for mass deposition will be collected every third day for two weeks (5 sampling intervals). A total of 60 samples (2 treatments x 5 reps x 5 intervals plus 10 background) will be collected. A canopy will be used to prevent rain water from washing the pesticide from the wooden framework prematurely.

The concentration of pesticide will be similar to that used during almond orchard dormant spray applications (approximately 1200 ppm). After determining what volume of liquid is necessary for complete coverage of the wooden structure, the same amount will be applied to each of the structures. A new batch will be mixed for each replicate and the mixture will be applied with a brush to the wooden surfaces. The individual replicates will be placed a minimum of 100 ft apart to prevent cross contamination.

Samples of the potted vegetation will be analyzed for background concentrations of diazinon before the experiment starts.

Diazinon mass per unit of vegetation dry weight will be calculated for each sample. Mean mass per unit for each treatment will be plotted against time. The data will be statistically analyzed with a repeated measures analysis of variance (ANOVA) with days as the repeated measure and oil vs. no oil as a treatment factor. The ANOVA table is given below.

<u>Source</u>	<u>df</u>	<u>Error term</u>
Treatment	2-1	Replicates(Treatment)
Reps(Treatment)	2(5-1)	
Days		
linear	1	Replicates x Days(Treatment)
quadratic	1	Replicates x Days(Treatment)
cubic + quartic	2	Replicates x Days(Treatment)
Treatment x Days		
linear	1	Replicates x Days(Treatment)
quadratic	1	Replicates x Days(Treatment)
cubic + quartic	2	Replicates x Days(Treatment)
Reps x Days(Trtmnt)	2(5-1)(5-1)	

The test of the main effect of treatment will indicate whether oil affects the overall level of deposition. The tests of the treatment by days interactions will indicate whether oil affects the rate of deposition.

V. SAMPLING METHODS

Vegetation samples will be collected by clipping approximately 50 grams for each sample, placing the sample in glass jars, and freezing until chemical analysis is performed. Chains of custody records will be kept for all samples.

VI. ANALYTICAL METHODS

The CDFA Chemistry Lab will analyze the vegetation samples using gas chromatographic methods developed earlier for detection of diazinon in plant

tissue. In-house quality control will consist of matrix spikes for each extraction set. No interlaboratory quality control is planned since the samples are not appropriate for splitting.

VII. TIMETABLE

The experiment will take place during February once a suitable experimental site is located. If chemical analysis is completed by May 30, 1990, a draft report should be ready for review by September, 1990.