PROTOCOL FOR DRIFT STUDY IN SAN LUIS OBISPO

I. INTRODUCTION

The off-target drift of MCPA was monitored by personnel from the Environmental Hazards Assessment Program to develop procedures for monitoring "real-time" air concentrations. Due to the shift in wind direction during the spray trial, the objectives of that study were not fully realized. This follow-up study was designed to satisfy those objectives and to answer additional questions raised by the study results.

II. OBJECTIVES

1. To repeat last years MCPA drift study designed to
   a. measure peak air concentrations and
   b. compare concentrations obtained during "real-time" sampling with those obtained during continuous sampling.
2. To examine, more closely, the dynamics of the decline in air concentrations over distance from the aerial application.
3. Compare air sampling equipment and determine which method gives the least variable results.

III. PERSONNEL

The monitoring studies will be conducted by personnel from the Environmental Hazards Assessment Program of the California Department of Food and Agriculture. The field sampling program and chemistry laboratory coordination will be supervised by Randall Segawa. Lisa Ross is responsible for study design and statistical analysis. ALL QUESTIONS ABOUT THE STUDY SHOULD BE DIRECTED TO MARY BROWN AT (916) 324-8916, ATSS 454-8916.

IV. SAMPLING PLAN

To meet objective one, last years monitoring design will be repeated except lovols will not be employed. Last year, concentrations obtained using lovols were more variable than from hivols so the study will be repeated using hivols only. The study will be conducted in mid-January in San Luis Obispo County, east of Paso Robles. For details of equipment and experimental design, refer to the "Protocol for Monitoring Pesticide Levels in Air During Aerial Applications to Agricultural Fields" and Table 1.

In addition, a more detailed look at meteorological conditions and droplet size distribution will be made to assess objective number two. A weather tower with temperature, relative humidity, and wind speed sensors at two heights will be employed to determine the meteorological stability factor (a factor which influences the distance that droplets will drift). Also, Kromecote cards (or similar fall out sheets) will be used to determine the size of droplets falling-out at different distances from the application. Both techniques will enable examination of the movement of particles on a qualitative basis and assist in interpreting the change in concentrations with distance from the application.

To meet objective number three, four "types" of air sampling equipment will be compared; hivols, lovols, covered hivols and Anderson lovols. These will operate for a series of four, five-minute intervals and continuously during a 20-minute application. This application will occur in the same area (within 100 ft.) as in objective one but on a different day. Samplers will be placed at 25 m downwind and one background sampler will run for 30 minutes immediately preceding the application. (Table 2).

V. QUALITY CONTROL

The trapping efficiency should be determined using 5 replicates at 2 concentrations at 20 and 5 minute intervals. Also determine the variability of the glass-wool spiking by spiking 10 glass-wool samples in hivol jars and analyzing immediately. This will add a total of 30 analyses to the overall study.

Table 1. Sampling plan to be used in assessing objective number one.

Distance	Time Intervals Hivol Air Samplers Will Run
25, 50 and 100m	Background (30-minutes immediately preceding application) 20-minutes (During application) 4 x 5 minutes (During application) Post-application (30-minutes immediately following application)
Upwind (75m)	Background 20-minutes Post-application

Analysis of variance (ANOVA) for objective 1a: Split plot in time with three replicates at each distance.

Source	df
Replicates	2
Distance	2
RxD (Error)	4
Time	3
RxT (Error)	6
DxT	6
RxTxD(Error)	12
TOTAL	35

ANOVA for objective 1b as above using difference data between 20-minute and 5-minute sampling.

Table 2. Sampling plan to be used in assessing objective number three.

Distance	Time Interval	Air Sampling Equipment
25 m	20-minutes	covered hivols (in replicate of 3) uncovered hivols Lovols (Gast) Andersons
25 m	4 x 5 minutes	as above
25 m	30-minute prior to application	uncovered hivol (background information)

Equipment	Number of Samples
covered hivols	15
uncovered hivols	16
Lovols	15
Andersons	15
TOTAL	61

There will be three ANOVAs conducted on these data:

1. A simple ANOVA to examine differences among the four "types" of sampling equipment (20 minute samples only).

2. A two-way ANOVA to examine differences among the four "types" of sampling equipment over time:

Source	df
Replicates	2
Apparatus	3
Time	3
AxT	9
Error	30
TOTAL	47

3. Comparison of continuous and interval sampling using difference data in a simple ANOVA.