

Protocol for Monitoring Pesticide Levels in Air
During Aerial Applications to Agricultural Fields

Objective: To develop procedures to monitor acute levels of pesticide drift resulting from aerial applications to agricultural fields.

Personnel: The monitoring studies will be under the direction of Don Weaver. Any inquiries regarding the monitoring program should be directed to him at (916) 324-8916 (ATSS 454-8916). Other lead personnel and their areas of responsibility are:

Lisa Ross — Study design and statistical analysis of data.

Roger Sava — Locate and secure fields and coordinate with pesticide applicators.

Cindy Garretson — Site selection for and operation of weather instruments.

Scott Simpson — Preparation and use of air samplers.

Tom Mischke — Preparation and operation of mobile laboratory.

Introduction: Studies designed to monitor drift of aerially applied pesticides usually include the collection of air samples representing exposure at a given location over a period of one to several hours. Average concentrations of pesticide can be calculated for the monitoring periods but actual acute levels for brief time periods are not known. For instance, we currently cannot document peak pesticide air concentrations. We must develop the capability of measuring acute pesticide exposure for short durations of time during and following aerial applications. This would provide a measure of real time exposure and a range of concentrations at the monitoring locations.

This study will be conducted to test air sampling methods that have potential for use during short sampling periods. The information obtained will be used to refine sampling methods and to plan subsequent studies.

Monitoring Plan: A study will be conducted to monitor aerial applications of MCPA isooctyl ester formulation herbicide to grain fields in San Luis Obispo

County in January and February, 1985. Test fields will be selected for size (one requiring 20–30 minutes for treatment is ideal), accessibility, and availability of monitoring sites.

Weather Instruments: Once a study site has been selected, a Met One instrument will be set up to record wind speed and direction data for a 1–2 week period. Wind data will be used to select monitoring sites. A Weathermeasure (wind speed and direction) and a Met One weather station (wind speed and direction, air temperature, relative humidity) will be operated during the study at upwind and downwind locations.

Air Sampling: Air samples will be collected using high volume air samplers calibrated at 1 cubic meter per minute and low volume air samplers calibrated at 20–25 liters per minute. All air samples will be collected on XAD-2 resin. One hi-vol and one lo-vol air sampler will be placed adjacent to each other at each location during the study and will hereafter referred to as "a set".

One "set" will be placed at the upwind end of the field, 25 meters from the edge. Air samples will be collected for 30 minutes before spraying begins, during the entire spray period, and for a 30 minute period after spraying has ended.

On the downwind side, groups of three replicate "sets" will be located 25, 50, and 100 meters from the edge of the field. Each of the three "sets" will be placed in a line and spaced 6 meters apart. Air samples will be collected for periods of 5 minutes from the time spraying begins until 5 minutes after spraying has been completed. An additional "set" will be located near the middle of each group and an air sample will be collected for 30 minutes before spraying begins, during the entire spray period, and for two consecutive 30 minute periods after spraying has stopped.

The total number of samples collected will depend upon the duration of the spray period but for a 30 minute spray, approximately 75 hi-vol and 75 low-vol samples would be collected.

Handling and Storage of Samples: All sampling media and containers will be prepared and pre-numbered at the California Department of Food and Agriculture Laboratories in Sacramento. Each device or container will be shipped to the sampling sites with an accompanying Chain of Custody Record. The Chain of Custody Record will be filled out by all parties handling or storing the sampling media or sample containers from the time they leave the Sacramento lab until they are returned to the lab for analysis. The Chain of Custody Record also contains an internal chain of custody record for use by the laboratory.

All samples will be sealed immediately after removal from the air samplers and placed on dry ice (-70 C) until and during transport to the CDFA laboratory in Sacramento.

All samples will be analyzed by the CDFA laboratory. Additionally, five hi-vol sampling jars will be spiked and analyzed by the CDFA laboratory to determine extraction efficiency.

12/14/84